

# EXHIBIT 190

**24 HOUR FITNESS WORLDWIDE INC. v.  
CONTINENTAL CASUALTY COMPANY et al.**

**United States Bankruptcy Court  
District of Delaware  
Case No. 20-11568 (KBO)  
Adv. Pro. No. 20-51051 (KBO)**

**Expert Report  
Of  
Mercedes R. Carnethon, Ph.D.**

**October 21, 2022**

Prepared By



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Mercedes R. Carnethon, Ph.D.

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Exhibit A: Curriculum Vitae for Mercedes R. Carnethon, Ph.D.

Exhibit B: List of Materials Considered

## I Introduction

I submit this Report in support of 24 Hour Fitness Worldwide Inc.'s ("24HF") adversarial proceeding in the United States Bankruptcy Court for the District of Delaware styled as *24 Hour Fitness Worldwide Inc. v. Continental Casualty Company et al.*, Case No. 20-11568 (KBO), Adv. Pro. No. 20-51051 (KBO).

## II Credentials and Professional Background

I am an epidemiologist, Professor and Vice Chair of the Department of Preventive Medicine, and Professor of Medicine in Pulmonary and Critical Care at the Northwestern University Feinberg School of Medicine. I have been a faculty member for 20 years after earning an A.B. in Human Biology with Honors from Stanford University, Master's and Doctoral Degrees in Epidemiology from the University of North Carolina at Chapel Hill, and postdoctoral training in cardiovascular disease epidemiology from the Stanford University School of Medicine. I have received funding for my research continuously by the National Institutes of Health as a Principal Investigator or Co-Investigator since 2003. Findings from my research have appeared in 315 original research articles, 20 commentaries and editorials, 15 scientific statements, and 3 published books.

My research typically focuses on the distribution and determinants of the leading causes of death in the United States and globally, including cardiovascular disease and lung disease. In October 2021, the National Heart, Lung, and Blood Institute Board of Scientific Counselors (NHLBI) appointed me to advise the Institute on research priorities and initiatives. I also serve as a Special Government Employee, a position awarded only to those with a substantial and sustained contribution to the field and required approval and appointment by a White House special committee. Additionally, the NHLBI solicits my expert opinion on a triannual basis to discuss the portfolio of research studies targeted for potential funding by the Institute.

Since the onset of the COVID-19 pandemic in 2020, I have contributed my expertise in research methodology and behavioral medicine to identifying populations at the greatest risk for severe COVID-19 infections. I have discussed the effectiveness and application of disease mitigation strategies with workplaces, schools, churches, and the like. I have also published scientific articles about antibody-determined prevalence of SARS-CoV-2 among healthcare workers,<sup>1</sup> viral load dynamics in mild to moderate infections,<sup>2</sup> behavioral responses to the pandemic,<sup>3</sup> and

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<sup>1</sup> Wilkins JT, Gray EL, Wallia A, Hirschhorn LR, Zembower TR, Ho J, Kalume N, Agbo O, Zhu A, Rasmussen-Torvik LJ, Khan SS, Carnethon M, Huffman M, Evans CT. Seroprevalence and Correlates of SARS-CoV-2 Antibodies in Health Care Workers in Chicago. *Open Forum Infect Dis.* Jan 2021;8(1); and Wilkins JT, Hirschhorn LR, Gray EL, Wallia A, Carnethon M, Zembower TR, Ho J, DeYoung BJ, Zhu A, Torvik LJR, Taiwo B, Evans CT. Serologic Status and SARS CoV-2 Infection over 6-Months of Follow-Up in Healthcare Workers in Chicago: A Cohort Study. *Infect Control Hosp Epidemiol.* Aug 9 2021:1-29.

<sup>2</sup> Caplan A, Bates KW, Brioni C, Santos A, Sabatini LM, Kaul KL, Carnethon MR, Khandekar JD, Greenland P. Clinical characteristics and viral load dynamics of COVID-19 in a mildly or moderately symptomatic outpatient sample. *PLoS One.* 2021;16(10).

<sup>3</sup> Lin AW, Granata FA, Trippel AK, Tello L, Stump TK, Wong M, Carnethon MR, Kershaw KN, Makelarski J, Weller D. Food Handling Concerns and Practices at Home during the COVID-19 Pandemic by Food Security Status. *J Food Prot.* Mar 1 2022;85(3):518-526.

vaccine intentions among healthcare workers.<sup>4</sup> Relatedly, I received financial support from the American Lung Association to determine the antibody prevalence of SARS-CoV-2 infection in a cohort of 4,000 young adults (ages 25-35).<sup>5</sup>

I have additionally contributed to public health messaging around the pandemic, appearing regularly on cable news (e.g., MSNBC), network television (e.g., ABC World News Tonight, PBS NewsHour, and Good Morning America) and radio (e.g., Bloomberg TV/radio and National Public Radio) in the United States and Canada (e.g., NewsNow) to interpret scientific concepts related to the COVID-19 pandemic. I also provided testimony on COVID-19 disparities among older adults to the U.S. Senate Special Committee on Aging on July 21, 2020,<sup>6</sup> and was an invited speaker to the National Disability Forum Conference for the Social Security Administration on November 18, 2020.<sup>7</sup> I have also been an invited speaker at numerous scientific conferences including the American Heart Association, Society for Behavioral Medicine, the National Institutes of Health, and the Society for Epidemiologic Research to discuss the impact of the COVID-19 pandemic on various population subgroups. I have not previously served as an expert witness in any court proceeding.

For further information concerning my qualifications and credentials, please consult my curriculum vitae, which is attached to this Report as **Exhibit A**. For my work in this case, I am being compensated at a rate of \$250 per hour. My compensation is not contingent on the outcome of this litigation.

### III Assignment, Materials Considered, and Methodology

As an epidemiologist, my studies focus on the distribution and causes of health events, including the prevalence of communicable diseases in particular populations. To that end, counsel for 24HF requested that I provide expert opinion testimony in this case to assist the trier of fact in, among other things: (1) evaluating and understanding the nature of SARS-CoV-2 (the virus that causes COVID-19) and COVID-19; (2) evaluating and understanding how SARS-CoV-2 and the COVID-19 disease are detected, spread, and transmitted; (3) evaluating 24HF's conclusion that, based on the prevalence of COVID-19 in the United States, and in the communities where 24HF operates, and the nature of 24HF's operations, COVID-19 was actually present and spreading at all of 24HF's locations in the winter and spring of 2020; and (4) considering whether it was reasonable and necessary for 24HF to close its club locations due to these circumstances.

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<sup>4</sup> Evans CT, DeYoung BJ, Gray EL, Wallia A, Ho J, Carnethon M, Zembower TR, Hirschhorn LR, Wilkins JT. Coronavirus disease 2019 (COVID-19) vaccine intentions and uptake in a tertiary-care healthcare system: A longitudinal study. *Infect Control Hosp Epidemiol*. Dec 27 2021:1-7.

<sup>5</sup> Reyfman PA, Sugar E, Hazucha H, Hixon J, Reynolds C, Bose S, Dransfield MT, Han MK, Estepar RSJ, Rice MB, Washko GR, Carnethon M, Kalhan R, American Lung Association Airways Clinical Research N, American Lung Association Airway's Clinical Research N. Study protocol for a national cohort of adults focused on respiratory health: the American Lung Association Lung Health Cohort (ALA-LHC) Study. *BMJ Open*. Jul 5 2021;11(7):e053342.

<sup>6</sup> The COVID-19 Pandemic and Seniors: A Look at Racial Disparities: <https://www.aging.senate.gov/hearings/the-covid-19-pandemic-and-seniors-a-look-at-racial-health-disparities>. Accessed June 22, 2022. Testimony: Washington, DC.

<sup>7</sup> Social Security Administration. Nov 18, 2020 COVID-19 and SSA Programs: Long-Term Health Effects (National Disability Forum: Social Security Administration). [https://www.ssa.gov/ndf/ndf\\_outreach.htm?tl=4](https://www.ssa.gov/ndf/ndf_outreach.htm?tl=4).

To evaluate these questions, practitioners in the field, like myself, utilize an accepted taxonomy to draw conclusions about causality.<sup>8</sup> The causality methodology epidemiologists use considers: (1) strength of effect; (2) consistency of findings observed across unique settings; (3) specificity—no other likely explanation; (4) temporality—the cause happens before the effect in time; (5) biological gradient—greater exposure should lead to greater incidence; (6) plausibility—a biologically plausible mechanism of association; (7) coherence between epidemiological observation and laboratory evidence; (8) experiment; and, (9) analogy—similarities between the observed association and other prior associations. Not all criteria must exist to reach a causality conclusion. Instead, there is a greater likelihood of causality as the number of present criteria increases. In the present case, causality includes an analysis of how the COVID-19 pandemic, including the presence and spread of COVID-19 and the SARS-CoV-2 virus, affected 24HF and its operations, and its conclusions and decisions.

In reaching my opinions in this Report, I took guidance from the above commonly accepted causal criteria (in particular consistency, biological plausibility, coherence, and analogy) that are subject to refinement or revision based on new knowledge gained as the pandemic, and the scientific literature, continues to evolve. I also base the opinions set forth in this Report on my personal experience and work as an epidemiologist and scholar, published scientific literature, media reports, government documents, as well as my review of certain discovery materials that have been provided to me by counsel in this case. A complete list of the materials that I considered in completing this Report is attached as **Exhibit B**. Additionally, I do not intend anything in this Report to convey an opinion regarding the interpretation or application of the insurance policies at issue in this litigation.

Further, as the discovery in this case continues and additional information is developed, including information from experts that the Insurer Defendants might engage, I reserve the right to supplement or modify my opinions either by submitting a supplemental report or through testimony at deposition and/or at trial of this matter. I also reserve the right to respond to any opinions offered by any Insurer Defendant in this case.

## IV Summary of Opinions

A summary of my opinions contained in this Report is as follows:

1. SARS-CoV-2 (the virus that causes COVID-19) was circulating in the United States as early as January 2020 causing COVID-19, including in the communities where 24HF operates its fitness clubs.
2. The number of COVID-19 cases in the United States actually detected through testing in the winter, spring, and summer of 2020 reflected only a small proportion of the total United States cases. This is because diagnosed cases included only severely symptomatic cases that presented for testing. Asymptomatic and minimally symptomatic cases went largely undetected and, therefore, not counted, even though the scientific community understood early on that such cases existed. Today, the scientific community generally accepts that the number of detected COVID-19 cases in the United States in the winter,

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<sup>8</sup> Hill AB. The Environment and Disease: Association or Causation? *Proc R Soc Med. May 1965;58:295-300.*

spring, and summer of 2020 represented only a fraction of the total number of actual COVID-19 cases that existed during that time.

3. There was no capacity for community surveillance testing for the presence of SARS-CoV-2 in the United States in March and April 2020. Consequently, the scientific consensus during this time was that COVID-19 was universally present (and spreading) throughout the United States, and that limiting interactions among people was the best strategy to stop continued spread. Given the paucity of testing, and the similarity of symptoms between individuals with COVID-19 and others with less fatal communicable respiratory illnesses caused by viruses, such as influenza or the common cold, it was necessary to treat all individuals with such symptoms as having COVID-19. Since the pandemic began during the winter months of 2020, there were innumerable individuals with such symptoms.<sup>9</sup> Indeed, given the testing limitations and the fact that individuals who were not symptomatic could spread the virus, it was necessary to treat everyone as if they were infected. The eventual implementation of mask mandates and social distancing requirements reflect this. These beliefs and strategies were reasonable and necessary at the time based on the information known, and these decisions appear even more reasonable and necessary given the benefit of hindsight.
4. The only agreed upon public health tools available at the time for stopping the ongoing spread of SARS-CoV-2 were lockdowns and quarantines. Symptom screening as a criterion for safe interactions among individuals was ineffective because SARS-CoV-2 was spreading amongst apparently asymptomatic and pre-symptomatic individuals. Accordingly, addressing facilities with known exposures to individuals displaying symptoms by, for example, cleaning and re-opening, was not a satisfactory option to protect individual health and safety, given the number of individuals infected with SARS-CoV-2 who never displayed symptoms, and the limitations associated with cleaning as an option for dealing with the spread of a virus. This is especially the case in a complex setting such as a fitness club with innumerable surfaces exposed to potential contamination from virus.
5. The primary method of SARS-CoV-2 transmission is through respiratory droplets. Based on standard practices in infection control, public health experts reasonably believed early in the pandemic that surface transmission was a pathway to exposure. Consequently, health officials and other health professionals advised people to regularly clean surfaces, a recommendation that left many individuals wiping down all surfaces, including groceries and food deliveries. While surface transmission is a plausible mechanism for COVID-19 transmission, surface cleaning alone is inadequate to stop the continued spread of the virus at indoor locations because, among other things, individuals visiting such facilities would likely re-introduce the virus on an ongoing basis and spread it through the air, not just onto surfaces. Moreover, to adequately clean surfaces, one would have to know exactly which surfaces had been contaminated, which was not

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<sup>9</sup> According to the CDC, “adults have an average of 2-3 colds per year” and “most people get colds in the winter and spring” and the symptoms of a cold including sore throat, runny nose, coughing, sneezing, headaches and body aches, which are symptoms similar to COVID-19. *See* Centers for Disease Control and Prevention. CDC Features: Common Colds: Protect Yourself and Others. Accessed October 16, 2022, 2022. <https://www.cdc.gov/features/rhinoviruses/index.html#:~:text=Each%20year%20in%20the%20United,any%20time%20of%20the%20year>.

feasible given the lack of testing and the fact that respiratory droplets could be dispersed over a wide area and latch onto surfaces that could not be readily identified and cleaned. In addition, the scientific community did not know to what extent available cleaning products could eliminate the virus.

6. Based on the prevalence of SARS-CoV-2 and COVID-19 in the United States, including in the communities where 24HF operates; given the nature of 24HF's operations and the information 24HF had regarding the spread of COVID-19 generally, and at its locations; and given the prevalence and presence of individuals with other respiratory illnesses with similar symptoms, and the inability to differentiate between them; 24HF's conclusion, as confirmed in deposition testimony in this case, that COVID-19 was actually present and spreading at each of its locations (i.e., among staff, patrons and other visitors) during the winter and early spring of 2020 was reasonable. Given all of this, I also agree it was reasonable and necessary for 24HF to close all of its locations for the health and safety of individuals visiting its clubs.

## V Statement of Opinions

### A. Severe Acute Respiratory Syndrome Coronavirus-19 (SARS-CoV-2)

Severe Acute Respiratory Syndrome Coronavirus-19 (SARS-CoV-2) is a member of a large family of viruses called coronaviruses that can infect animals and humans and cause upper respiratory tract illnesses. SARS-CoV-2 is the virus that leads to the COVID-19 illness. SARS-CoV-2 is a small enveloped virus that is approximately 1  $\mu\text{m}$  in diameter and most commonly spreads through respiratory droplets when an infected person breaths, talks, coughs, or sneezes. SARS-CoV-2 is most often transmitted to another host by breathing viral particles, which then start to replicate in an individual's respiratory tract. The virus can survive on surfaces for some amount of time and may cause infection if a person touches the virus and then transmits it into their system by touching their mouth, nose, or eyes. An individual infected with SARS-CoV-2 can develop a cough and influenza-like symptoms—and, in severe cases, pneumonia and acute respiratory distress syndrome (ARDS).<sup>10</sup> For some individuals, the virus can lead to a more significant inflammatory response risking harm to multiple organs including the lungs, heart, stomach, or brain.

The uncertain and variable course of illness across individuals remains a significant source of concern. Although there are known correlates of severe (i.e., hospitalization and death) illness from COVID-19 such as autoimmune disease, pre-existing cardiovascular disease, severe lung disease, diabetes, obesity, and cancers, there remain individuals who experience severe illness in the absence of these pre-existing conditions. Even with the introduction of vaccines in late

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<sup>10</sup> Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DSC, Du B, Li LJ, Zeng G, Yuen KY, Chen RC, Tang CL, Wang T, Chen PY, Xiang J, Li SY, Wang JL, Liang ZJ, Peng YX, Wei L, Liu Y, Hu YH, Peng P, Wang JM, Liu JY, Chen Z, Li G, Zheng ZJ, Qiu SQ, Luo J, Ye CJ, Zhu SY, Zhong NS, China Medical Treatment Expert Group for C. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med.* Apr 30 2020;382(18):1708-1720.

2020 to essential workers and age-eligible adults during the spring of 2021, COVID-19 rose to become the third leading cause of death in the United States by the close of 2021.<sup>11</sup>

Symptoms of COVID-19 are also present in the common cold, influenza, adenoviruses, rhinoviruses, respiratory syncytial virus, and other coronaviruses. The primary characteristics distinguishing COVID-19 from other respiratory or bacterial illnesses are its high rates of hospitalization and case fatality.<sup>12</sup> In 2021, the Centers for Disease Control and Prevention (CDC) estimated that between 1999 and 2019 there were 1.8 deaths from influenza per 100,000 in the population, while the estimated death rate from COVID-19 in 2020 was 217.5 per 100,000.<sup>13</sup> Importantly, scientists largely agree that COVID-19 deaths remain undercounted because of the limited capacity to test for COVID-19 in early 2020 in most countries, including in the United States.

## B. Introduction of SARS-CoV-2 to Humans

The scientific community currently agrees that the introduction of SARS-CoV-2 to humans began with zoonotic (i.e., animal to human) transmission of the SARS-CoV-2 virus (the virus that leads to the illness of COVID-19) from an animal species in an open market in Wuhan, China to a human during the fall of 2019.<sup>14</sup> While the species that carried the virus to humans remains unclear, contemporary evidence points to a naturally occurring event and not a laboratory “leak” or deliberate human activity.

Throughout the fall and into the winter of 2019, a cluster of cases of severe respiratory illnesses began to appear in and around Wuhan, China. Spikes in hospitalizations and illnesses in the autumn of 2019 and early winter months of 2020 led the WHO to announce publicly a “mysterious coronavirus-related pneumonia” on January 9, 2020.

Following identification of the original cluster of cases tied to the open market in Wuhan, China, clusters of outbreaks began to spread throughout China. One such outbreak was tied to Lunar New Year celebrations that brought together young adult revelers from around the country.<sup>15</sup> These individuals then returned to their home provinces and countries, which likely caused the virus to spread beyond China. Global travel eventually led to spread throughout Europe and then other continents, including North America. In Europe, Italy was the first country to detect

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<sup>11</sup> Ahmad FB, Cisewski JA, Anderson RN. Provisional Mortality Data - United States, 2021. *MMWR Morb Mortal Wkly Rep.* Apr 29 2022;71(17):597-600.

<sup>12</sup> Iacobucci G. Covid and flu: what do the numbers tell us about morbidity and deaths? *BMJ.* 2021;375:n2514; Jeganathan N, Grewal S, Sathananthan M. Comparison of Deaths from COVID-19 and Seasonal Influenza in the USA. *Lung.* Oct 2021;199(5):559-561.

<sup>13</sup> Centers for Disease Control and Prevention. Influenza Fast Stats. Accessed October 21, 2022: <https://www.cdc.gov/nchs/faststats/flu.htm>.

<sup>14</sup> Umakanthan S, Sahu P, Ranade AV, Bukelo MM, Rao JS, Abrahao-Machado LF, Dahal S, Kumar H, Kv D. Origin, transmission, diagnosis and management of coronavirus disease 2019 (COVID-19). *Postgrad Med J.* Dec 2020;96(1142):753-758.

<sup>15</sup> Chen S, Yang J, Yang W, Wang C, Barnighausen T. COVID-19 control in China during mass population movements at New Year. *Lancet.* Mar 7 2020;395(10226):764-766.

substantial numbers of COVID-19,<sup>16</sup> although by mid-February outbreaks had occurred in 28 European countries,<sup>17</sup> on cruise ships,<sup>18</sup> and in congregate settings such as nursing homes.

Evidence of the spread of SARS-CoV-2 within Asia and Europe led the CDC to begin screening incoming passengers arriving at select airports in the United States on January 20, 2020. For example, the CDC performed passenger screens at airports that had the highest volume of travelers from Wuhan Province to the United States. These airports included John F. Kennedy airport in New Jersey/New York (JFK), San Francisco International airport (SFO), and Los Angeles International airport (LAX). Also around January 20, 2020, the first confirmed case of COVID-19 in the United States was detected in Washington State in an individual who had recently traveled from the Wuhan Province in China.<sup>19</sup>

Also in or around January 2020, transmission patterns of infections suggested to scientists in China that the illness was circulating from person to person. Given the significant loss of life associated with COVID-19, China implemented strict and unprecedented lockdowns in Wuhan and neighboring provinces on January 23, 2020. On January 31, 2020, after confirming 9,800 known cases and 200 deaths worldwide, the WHO declared a Global Health Emergency. The WHO then upgraded the Global Health Emergency to a pandemic on March 11, 2020. A “pandemic” constitutes an outbreak of a disease that occurs over a wide geographic area (such as multiple countries or continents) and typically affects a significant proportion of the population.

Multiple clusters of cases in March 2020, not tied to travel, followed the initial travel-related cases in the United States. The case clusters began in states on both coasts—California, Washington, and New York. These case clusters were the first evidence of community spread in the United States. As defined by the CDC, community spread is the spread of an infectious disease where the source of the infection is unknown. Community spread indicates widespread transmission of the virus from person to person throughout the community at large. On February 26, 2020, the CDC posted an advisory about the first case of community spread in the United States in California.<sup>20</sup> Subsequent to the initial case, similar outbreaks began occurring

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<sup>16</sup> Indolfi C, Spaccarotella C. The Outbreak of COVID-19 in Italy: Fighting the Pandemic. *JACC Case Rep.* Jul 15 2020;2(9):1414-1418.

<sup>17</sup> Spiteri G, Fielding J, Diercke M, Campese C, Enouf V, Gaymard A, Bella A, Sognamiglio P, Sierra Moros MJ, Riutort AN, Demina YV, Mahieu R, Broas M, Bengnér M, Buda S, Schilling J, Filleul L, Lepoutre A, Saura C, Mailles A, Levy-Bruhl D, Coignard B, Bernard-Stoecklin S, Behillil S, van der Werf S, Valette M, Lina B, Riccardo F, Nicastri E, Casas I, Larrauri A, Salom Castell M, Pozo F, Maksyutov RA, Martin C, Van Ranst M, Bossuyt N, Siira L, Sane J, Tegmark-Wisell K, Palmérus M, Broberg EK, Beauté J, Jorgensen P, Bundle N, Pereyaslov D, Adlhoc C, Pukkila J, Pebody R, Olsen S, Ciancio BC. First cases of coronavirus disease 2019 (COVID-19) in the WHO European Region, 24 January to 21 February 2020. *Euro Surveill.* Mar 2020.

<sup>18</sup> Nakazawa E, Ino H, Akabayashi A. Chronology of COVID-19 Cases on the Diamond Princess Cruise Ship and Ethical Considerations: A Report From Japan. *Disaster Med Public Health Prep.* Aug 2020;14(4):506-513.

<sup>19</sup> Bajema KL, Wiegand RE, Cuffe K, Patel SV, Iachan R, Lim T, Lee A, Moyse D, Havers FP, Harding L, Fry AM, Hall AJ, Martin K, Biel M, Deng Y, Meyer WA, III, Mathur M, Kyle T, Gundlapalli AV, Thurnburg NJ, Petersen LR, Edens C. Estimated SARS-CoV-2 Seroprevalence in the US as of September 2020. *JAMA Internal Medicine.* 2021;181(4):450-460; Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, Spitters C, Ericson K, Wilkerson S, Tural A, Diaz G, Cohn A, Fox L, Patel A, Gerber SI, Kim L, Tong S, Lu X, Lindstrom S, Pallansch MA, Weldon WC, Biggs HM, Uyeki TM, Pillai SK. First Case of 2019 Novel Coronavirus in the United States. *New England Journal of Medicine.* 2020;382(10):929-936.

<sup>20</sup> Centers for Disease Control and Prevention. CDC Confirms Possible Instance of Community Spread of COVID-19 in U.S. 2020. Accessed October 7, 2022. <https://www.cdc.gov/media/releases/2020/s0226-Covid-19/>

elsewhere in the U.S. One of the first large outbreaks of COVID-19 in the United States took place in March at a choir practice in Washington State when 32 out of 122 attendees contracted COVID-19, and another 20 probable secondary COVID-19 cases occurred.<sup>21</sup> An outbreak at a skilled nursing home in Washington State was a harbinger of the devastating spread of the virus in congregate care settings.<sup>22</sup>

Each of these outbreaks shared at least one common theme: groups of people were together indoors for an extended length of time in the presence of the virus. The shared environments, inclusive of the indoor air and surfaces, were considered primary sources for transmission. Following the steps taken by countries in Asia and Europe, which launched heretofore unheard of quarantine policies to prohibit large groups from gathering and limited business operations to protect workers and patrons both, the United States began to take similar steps beginning in March 2020.<sup>23</sup>

### C. Mitigation Strategies for SARS-CoV-2

In the spring and summer of 2020, the capacity and ability for detecting SARS-CoV-2 were severely limited. As a result, the United States (as well as other countries) initiated mitigation strategies designed to curtail the ongoing spread by shutting down the primary mode of transmission: person-to-person contact. Decisions in the United States to cease non-essential business to control the ongoing spread of the disease were based on analogy from European and Asian countries that had already imposed their own lockdowns, consistent with best practices in public health. Government action to close non-essential business and impose mandatory quarantines were chosen because of historical actions taken to stop the spread of other infectious diseases, including the initial SARS outbreak in 2003, the Ebola outbreaks in West Africa in 2014, and even further back in history during plagues of cholera in the 14th century. These actions were based on the biological likelihood of person-to-person transmission in enclosed places and analogous pandemic responses throughout history.

However, even before many state and local governments in the United States acted, there were a series of public closures of business and recreational operations due to the presence and spread of the virus. For example, the National Basketball Association (NBA) abruptly canceled games on the evening of March 11, 2020 following notification of infected players.<sup>24</sup> The NBA

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[spread.html#:~:text=Community%20spread%20means%20spread%20of,picked%20up%20by%20astute%20clinicians.](#)

<sup>21</sup> Hamner L, Dubbel P, Capron I, Ross A, Jordan A, Lee J, Lynn J, Ball A, Narwal S, Russell S, Patrick D, Leibrand H. High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice - Skagit County, Washington, March 2020. *MMWR Morb Mortal Wkly Rep.* May 15 2020;69(19):606-610.

<sup>22</sup> McMichael TM, Clark S, Pogosjans S, Kay M, Lewis J, Baer A, Kawakami V, Lukoff MD, Ferro J, Brostrom-Smith C, Riedo FX, Russell D, Hiatt B, Montgomery P, Rao AK, Currie DW, Chow EJ, Tobolowsky F, Bardossy AC, Oakley LP, Jacobs JR, Schwartz NG, Stone N, Reddy SC, Jernigan JA, Honein MA, Clark TA, Duchin JS, Public Health S, King County E, Team CC-I. COVID-19 in a Long-Term Care Facility - King County, Washington, February 27-March 9, 2020. *MMWR Morb Mortal Wkly Rep.* Mar 27 2020;69(12):339-342.

<sup>23</sup> Levenson M. Scale of China's Wuhan Shutdown is Believed to be Without Precedent. *The New York Times.* <https://www.nytimes.com/2020/01/22/world/asia/coronavirus-quarantines-history.html>.

<sup>24</sup> Aschburner S. Coronavirus pandemic causes NBA to suspend season after player tests positive. *NBA.* March 12, 2020. Accessed August 8, 2022. <https://www.nba.com/news/coronavirus-pandemic-causes-nba-suspend-season>.

subsequently paused the season indefinitely the next day, and within a few days, the National Collegiate Athletic Association (NCAA) canceled both of its college basketball tournaments.<sup>25</sup>

Across the next two weeks and beyond, multiple U.S. states, counties and cities closed schools, and workplaces asked their employees to work remotely, all reflecting the concept that individuals needed to be treated as if they were infected with the virus and could spread it to others. The Boston University COVID Mitigation Policy Tracking Database compiled a listing of dates of closures of essential businesses across the country. See **Table 1** below.<sup>26</sup>

**Table 1: Listing of Business Closures by State and Date**

State	Start	End	State	Start	End
Alabama	4/4/2020	4/30/2020	Missouri	4/6/2020	5/4/2020
Alaska	3/28/2020	4/24/2020	Montana	3/28/2020	4/26/2020
Arizona	3/31/2020	5/16/2020	Nebraska		
Arkansas			Nevada	3/31/2020	5/9/2020
California	3/19/2020	1/25/2021	New Hampshire	3/28/2020	6/16/2020
Colorado	3/26/2020	4/27/2020	New Jersey	3/21/2020	6/9/2020
Connecticut		5/20/2020	New Mexico	3/24/2020	
Delaware	3/24/2020	6/1/2020	New York	3/22/2020	6/27/2020
District of Columbia	4/1/2020	5/29/2020	North Carolina	3/30/2020	5/22/2020
Florida	4/3/2020	5/18/2020	North Dakota		
Georgia	4/3/2020	5/1/2020	Ohio	3/24/2020	5/20/2020
Hawaii	3/25/2020	5/31/2020	Oklahoma	0	5/15/2020
Idaho	3/25/2020	5/1/2020	Oregon	3/23/2020	6/19/2020
Illinois	3/21/2020	5/29/2020	Pennsylvania	4/1/2020	6/5/2020
Indiana	3/25/2020	5/18/2020	Rhode Island	3/28/2020	5/9/2020
Iowa			South Carolina	4/7/2020	5/4/2020
Kansas	3/30/2020	5/4/2020	South Dakota		
Kentucky		6/29/2020	Tennessee	4/2/2020	4/29/2020
Louisiana	3/23/2020	5/15/2020	Texas	0	5/1/2020
Maine	4/2/2020	5/31/2020	Utah		
Maryland	3/30/2020	5/15/2020	Vermont	3/24/2020	5/15/2020
Massachusetts	3/24/2020	5/18/2020	Virginia	3/30/2020	5/29/2020
Michigan	3/24/2020	6/1/2020	Washington	3/23/2020	6/1/2020
Minnesota	3/28/2020	5/18/2020	West Virginia	3/24/2020	5/5/2020
Mississippi	4/3/2020	4/27/2020	Wisconsin	3/25/2020	5/13/2020
			Wyoming		

<sup>25</sup> NCAA. NCAA cancels men's and women's basketball championships due to coronavirus concerns. Accessed August 8, 2022. <https://www.ncaa.com/live-updates/basketball-men/d1/ncaa-cancels-mens-and-womens-basketball-championships-due>.

<sup>26</sup> Additionally, a compendium of COVID-19 orders including those cited here may be accessed at via the Council of State Government Orders. See The Council of State Government Orders. 2020-2021 Executive Orders. Accessed October 21, 2022. <https://web.csg.org/covid19/executive-orders/>.

For example, on March 19, 2020, California implemented laws to shut down all non-essential activities and imposed a quarantine. The Governor's Order noted, "in a short period of time, COVID-19 has rapidly spread throughout California, necessitating updated and more stringent guidance from federal, state, and local public health officials." Other states soon followed suit. The Order issued by the Governor of the State of Washington on March 23, 2020 addressed "the continued worldwide spread of COVID-19, its significant progression in Washington State, and the high risk it poses to our most vulnerable populations." The Order recognized the notion that everyone had to be treated as if they had COVID-19 by "prohibiting all people in Washington State from leaving their homes or participating in . . . gatherings of any kind regardless of the number of participants" and "preventing all non-essential businesses" from conducting business. Such statewide orders also reflected the fact that indoor settings where people congregated, such as gyms, were particularly dangerous for the spread of COVID-19. Additionally, the Texas Governor's Order on March 31, 2020 ordered individuals in Texas to "avoid eating or drinking at bars, restaurants and food courts, or visiting gyms, massage establishments, tattoo studios, piercing studios, or cosmetology salons."

Of note, this data captures state-level closures, and does not factor in variability in closing dates by counties and cities, which, in many cases, had authority to work independently from states to account for the local context. For example, within San Francisco and Alameda counties in Northern California, stay-at-home orders were in place as early as March 16, which affected all businesses operating in those areas.<sup>27</sup>

The order issued by Alameda County discussed the ongoing spread of COVID-19 throughout the Bay Area of California, and the fact that asymptomatic individuals can transmit the disease:<sup>28</sup>

6. This Order is issued based on evidence of increasing occurrence of COVID-19 within the County and throughout the Bay Area, scientific evidence and best practices regarding the most effective approaches to slow the transmission of communicable diseases generally and COVID-19 specifically, and evidence that the age, condition, and health of a significant portion of the population of the County places it at risk for serious health complications, including death, from COVID-19. Due to the outbreak of the COVID-19 virus in the general public, which is now a pandemic according to the World Health Organization, there is a public health emergency throughout the County. Making the problem worse, some individuals who contract the COVID-19 virus have no symptoms or have mild symptoms, which means they may not be aware they carry the virus. Because even people without symptoms can transmit the disease, and because evidence shows the disease is easily spread, gatherings can result in preventable transmission of the virus. The scientific evidence shows that at this stage of the emergency, it is essential to slow virus transmission as much as possible to protect the most vulnerable and to prevent the health care system from being overwhelmed. One proven way to slow the transmission is to limit interactions among people to the greatest extent practicable. By

<sup>27</sup> Additionally, the database information is based on media reports and publicly available records and represents a best estimate. However, the patterns consistently indicate that most states enacted closures in March or April of 2020.

<sup>28</sup> Alameda County Health Officer. Order of the County Health Officer to Shelter in Place. March 16, 2020. <https://www.acgov.org/documents/Final-Order-to-Shelter-In-Place.pdf>.

Early guidance from the CDC and other health agencies also reflected the concept that all individuals presenting with illness symptoms needed to be treated as having COVID-19. For example, on March 24, 2020, the United States Surgeon General warned that, “everyone needs to act as if they have the virus right now. So, test or no test, we need you to understand you could be spreading it to someone else. Or you could be getting it from someone else. Stay at home.”<sup>29</sup> Moreover, California’s Department of Industrial Relations issued guidelines that any person presenting with “respiratory illness symptoms” should be treated and isolated as if they were infected with the virus.<sup>30</sup> The CDC issued similar guidance for all workplaces in the United States, urging employers to send employees presenting with “respiratory illness symptoms” home.<sup>31</sup>

These actions by sports leagues, state and local governments, health agencies, and businesses, within a relatively short period of time from the initial identification of SARS-CoV-2 in the United States, reflect the collective goal at the time to “flatten the curve” to curtail the ongoing and pervasive spread of the virus. This was particularly the case at indoor settings where people gather to protect the health and safety of individuals. Flattening the curve was also important to prevent overwhelming hospital systems by continued spread of the virus. Extremely high case fatality rates underscored these decisions to close businesses due to the presence and spread of the virus throughout communities, even though the social and economic implications of such closures were severe.

Mirroring the variability in timing of business closures, there was great variability in the businesses that were permitted to be open. Similarly, there was also variability under what conditions (e.g., limited capacity) and when a business could re-open across and within the United States. Variability in these rollbacks of public health mitigation strategies was guided in part by health metrics related to disease transmission in a given area and by public sentiment in the region.<sup>32</sup>

By mid-year of 2020 and into 2021, some jurisdictions deemed reopening possible because of the expanded capacity to identify those infected with the SARS-CoV-2 virus. Consequently, the impact of the public health policies in reducing continued transmission and the economic impact of the policies varied. Even in locations where businesses could reopen, the economic impacts of the pandemic continued in that many individuals concerned about contracting and spreading the virus were reluctant to resume their pre-pandemic activities. In addition, many businesses—even after being allowed to reopen—were required to adopt certain mitigation measures such as reduced capacity to allow for social distancing, installing protective barriers, etc., and some businesses adopted more restrictive measures on their own over-concerns about spreading the

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<sup>29</sup> Shabad, R. Surgeon general has coronavirus warning: ‘This week, it’s going to get bad’. *NBC News*. Accessed October 21, 2022. <https://www.nbcnews.com/politics/white-house/surgeon-general-has-coronavirus-warning-week-it-s-going-get-n1166421>.

<sup>30</sup> Cal/OSHA. Cal/OSHA Interim Guidelines for General Industry on 2019 Novel Coronavirus Disease (COVID-19). March 4, 2020. <https://caltransit.org/cta/assets/File/CalOSHA%20Guidelines%20for%20General%20Industry%20on%20Coronavirus.pdf>.

<sup>31</sup> Centers for Disease Control and Prevention. Interim guidance for businesses and employers to plan and respond to 2019 coronavirus disease 2019 (COVID-19), February 2020. Accessed on October 21, 2022. <https://stacks.cdc.gov/view/cdc/85488>.

<sup>32</sup> Kiviniemi MT, Orom H, Hay JL, Waters EA. Prevention is political: political party affiliation predicts perceived risk and prevention behaviors for COVID-19. *BMC Public Health*. 2022/02/14 2022;22(1):298.

virus to employees and customers, including decisions to delay reopening altogether due to these concerns. In some locations, businesses permitted to reopen had to shut down again due to spikes in the spread of the virus before they could reopen permanently. This occurred in California with respect to fitness clubs.

#### D. SARS-CoV-2 Detection

The first step in epidemiologic surveillance is measuring the proportion of the population with the disease (i.e., prevalence) and the number of new cases that are detected within a given time period in the population at risk (i.e., the incidence). Barriers to identifying those infected with any “new” illness are common. Alternative and acceptable strategies are in place to estimate the presence of the disease that rely on clinical presentations of illness that align with observations among confirmed cases (i.e., symptomatology).

Initial community spread of SARS-CoV-2, and the resulting COVID-19 illness, went unrecognized or, at least, heavily undercounted in the United States and other countries. There are at least two primary reasons: (1) the arrival of the virus at a time when other respiratory viruses, such as the flu and common cold, were widely circulating, which obscured the initial spike; and (2) a severely limited capacity for testing and diagnosis.

In the Northern Hemisphere, the arrival of the cooler winter months triggers a high rate of circulating communicable respiratory illnesses, with rates peaking in the United States between December and February.<sup>33</sup> The year 2020 was no exception, with anecdotal reports in the media that December through January appeared to be a particularly severe flu season. Distinguishing between COVID-19, or any new virus, and existing communicable respiratory illnesses is challenging, and these challenges made it necessary at the time to treat any individual with a respiratory illness as having COVID-19. This posed considerable challenges for facilities with many individuals routinely coming in and out, like the 24HF locations. For example, as the CDC estimates, the average individual gets 2-3 colds per year and COVID-19 was circulating during the heart of cold and flu season.<sup>34</sup> It is without reasonable dispute that individuals with the common cold and related symptoms would have been present in each of the 24HF locations during this period, as well as individuals with the flu.

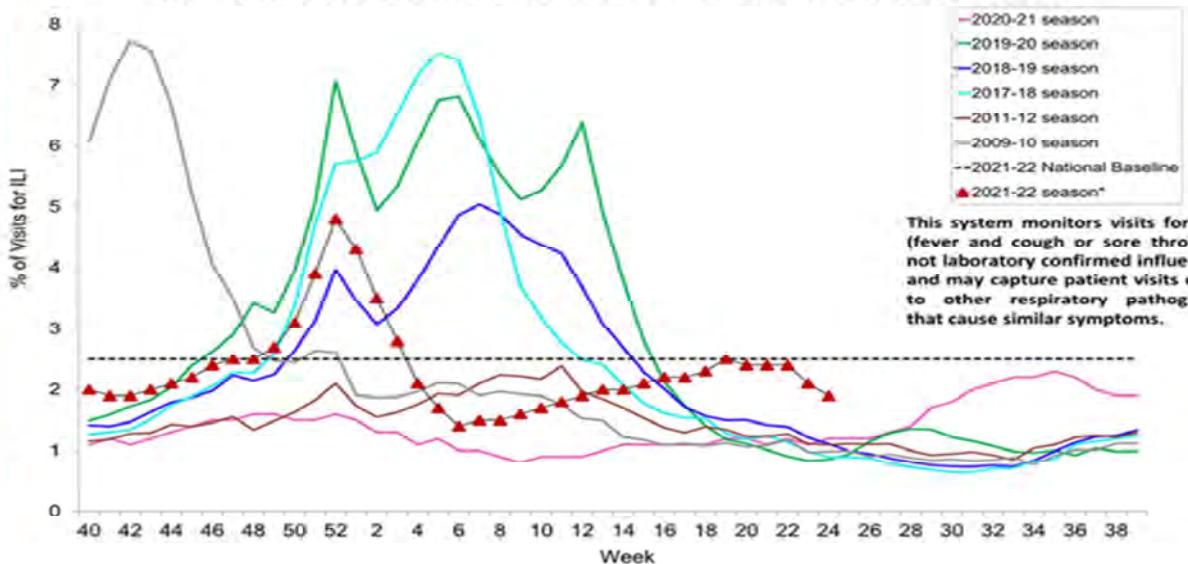
One signal indicating the introduction of a new disease is when hospitalization and death from similarly presenting illness vary either up (suggesting capture of more than just those with detectable illness) or down (suggesting that the new illness is infecting some proportion of people who would usually present with those illnesses) from what would be expected. **Figure 1** presents surveillance estimates collected by the U.S. Centers for Disease Control and Prevention for flu seasons (October through May) ranging from 2009-10 through 2020-21. Notable features of the chart are that as compared with the 2018-19 flu season (dark blue), the 2019-20 season (green) reports a higher rate of outpatient visits for influenza-like illnesses in nearly every month of the year. As noted on the chart, the system is capturing symptoms—notably fever, cough and sore

<sup>33</sup> Centers for Diseases Control and Prevention. Flu Season. Accessed June 30, 2022. <https://www.cdc.gov/flu/about/season/flu-season.htm#:~:text=The%20exact%20timing%20and%20duration,last%20as%20late%20as%20May>.

<sup>34</sup> Centers for Disease Control and Prevention. CDC Features: Common Colds: Protect Yourself and Others. Accessed October 16, 2022. <https://www.cdc.gov/features/rhinoviruses/index.html#:~:text=Each%20year%20in%20the%20United,any%20time%20of%20the%20year>.

throat—shared across many respiratory illnesses. Higher rates of illness in 2019-20 reflect the introduction of a new pathogen, namely SARS-CoV-2.

**Figure 1: Percentage of Outpatient Visits for Respiratory Illness Reported By The U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2021-2022\* and Selected Previous Seasons**



Source: [https://www.cdc.gov/flu/weekly/?deliveryName=USCDC\\_7\\_3-DM12249](https://www.cdc.gov/flu/weekly/?deliveryName=USCDC_7_3-DM12249)

Notably, the level of illness in the 2020-21 season (depicted in magenta) was significantly lower—and the lowest during the surveillance period captured. Population mitigation measures adopted in response to the COVID-19 pandemic, which included making workers with respiratory illness symptoms stay home, closing non-essential businesses and reducing congestion in group-settings, succeeded in reducing transmission of all respiratory illnesses, despite the presence of the COVID-19 pandemic. These measures were reasonable and necessary given the lack of testing available and the resultant difficulties in distinguishing between individuals with COVID-19 and individuals with the flu or other less-harmful illnesses.

Missed diagnoses (i.e., undercounts) and misdiagnosis (i.e., incorrect attribution of disease) of COVID-19 with other respiratory illnesses during late 2019 and early 2020 were compounded by challenges in developing and distributing an assay for detecting the SARS-CoV-2 virus. The U.S. Centers for Disease Control and Prevention initially sent test kits to state health departments, but after collecting the samples, they required processing of the assays at CDC laboratories. These procedures led to substantial delays identifying cases of COVID-19. Further, given the limited availability of testing kits, only hospitalized patients or patients with a known direct contact with someone who was positive could obtain testing.

The intent behind these rules was to allocate scarce resources (i.e., diagnostic capacity) to the most vulnerable persons (e.g., sick individuals in the hospital) or those with a high pre-test probability of being positive for SARS-CoV-2 (i.e., people with a known exposure). However, these policies precluded the use of test kits to detect the virus in community settings, which meant that anyone showing symptoms of even mild illness were considered as infected with SARS-CoV-2. In other words, individuals presenting with flu-like or cold symptoms, for

example, had to be considered as having COVID-19 given the inability to conduct widespread testing. An individual with symptoms of cold, influenza, or other respiratory illnesses coming into a 24 Hour Fitness club, for example, had to be treated with the same level of concern as someone with COVID-19 would be treated, as the ability to distinguish between different communicable illnesses was extremely difficult, if at all possible, early in the pandemic. The prevalence of communicable respiratory illnesses in winter 2019 and spring 2020, which coincided with cold and flu season in the Northern Hemisphere—meant that individuals of concern were regularly in and out of 24HF clubs on a daily basis.

While it was necessary to presume that symptomatic individuals had COVID-19 and treat them accordingly, it was even more challenging to deal with the phenomenon of individuals who did not have any symptoms, but who were still spreading disease. Asymptomatic and pre-symptomatic spread posed risks to the community at large and, without surveillance testing of a random sample of the population (not just those who have symptoms), the safest possible action by governments, businesses, and schools was to restrict interactions among all individuals to slow down the ongoing spread of disease. In other words, the safest and necessary course of action was to act as though everyone was infected and spreading the virus.

Nevertheless, laboratories at academic institutions did develop tests to identify antibodies to the virus, which they deployed to estimate the number of cases in a given region (**Figure 2**).<sup>35</sup> These tests are what allowed for the early estimates of how widely SARS-CoV-2 was circulating in U.S. communities.

#### **E. Prevalence of SARS-CoV-2 in the United States in 2020**

The current understanding of the COVID-19 timeline in the United States is informed by a series of retrospective studies relying on trend data for respiratory infection (reflected by **Figure 1**) and utilizing bio-specimens initially collected for other purposes.

Retrospective investigations in archived blood and urine samples indicate that SARS-CoV-2 was present and circulating widely in major metropolitan areas in the United States in the winter months of 2020.<sup>36</sup> In one such study, the prevalence of SARS-CoV-2 was 5% between March 12-13 and 15-16 in Los Angeles County. The authors commented that the prevalence was “concerning” given that the average age of patients was 38 years old and that all patients had mild illness and thus were circulating in the community and at risk of transmitting the illness to others in the population.<sup>37</sup> This further illustrates the points made above regarding difficulties dealing with any individuals displaying respiratory illness symptoms.

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<sup>35</sup> Havers FP, Reed C, Lim T, Montgomery JM, Klena JD, Hall AJ, Fry AM, Cannon DL, Chiang C-F, Gibbons A, Krapiunaya I, Morales-Betouille M, Roguski K, Rasheed MAU, Freeman B, Lester S, Mills L, Carroll DS, Owen SM, Johnson JA, Semenova V, Blackmore C, Blog D, Chai SJ, Dunn A, Hand J, Jain S, Lindquist S, Lynfield R, Pritchard S, Sokol T, Sosa L, Turabelidze G, Watkins SM, Wiesman J, Williams RW, Yendell S, Schiffer J, Thornburg NJ. Seroprevalence of Antibodies to SARS-CoV-2 in 10 Sites in the United States, March 23-May 12, 2020. *JAMA Internal Medicine*. 2020;180(12):1576-1586.

<sup>36</sup> Spellberg B, Haddix M, Lee R, Butler-Wu S, Holtom P, Yee H, Gounder P. Community Prevalence of SARS-CoV-2 Among Patients With Influenzalike Illnesses Presenting to a Los Angeles Medical Center in March 2020. *JAMA*. 2020;323(19):1966-1967.

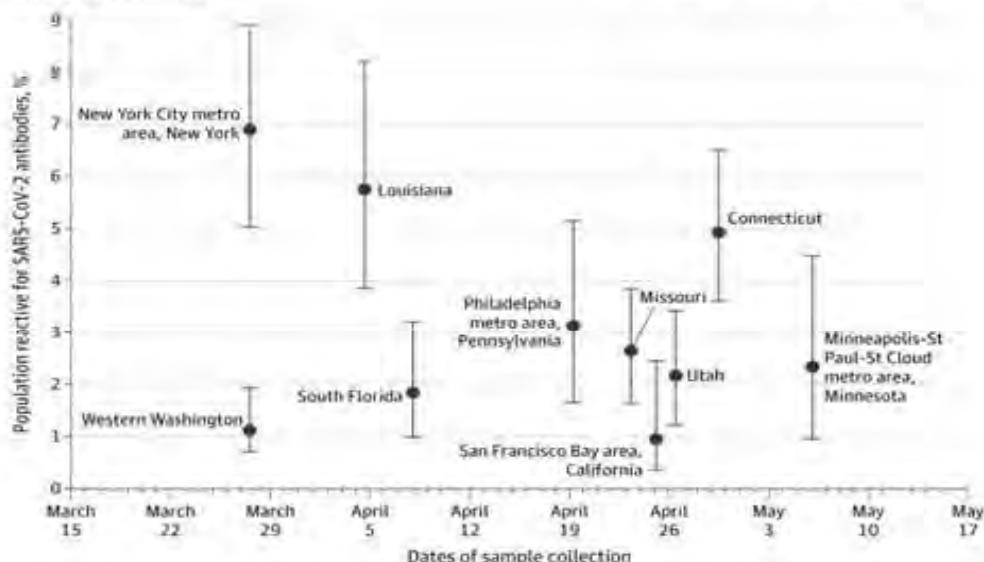
<sup>37</sup> *Id.*

Another commonly used strategy to detect illness deployed rapidly during the pandemic was to test blood samples (i.e., serum) for the presence of antibodies to the virus. These so-called seroprevalence studies were able retroactively to identify infection in the community. **Figure 2** displays findings from a seroprevalence study conducted across a broader time interval (March 23 to May 12) and in multiple cities in the United States.

**Figure 2: Seroprevalence of Antibodies to SARS-CoV-2 in 10 Sites in the US, March 23-May 12 2020**

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**A Estimates of seroprevalence**



JAMA Intern. Med. 2020;180(12):1576-1586.

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There was wide variability in the detection of antibodies to the SARS-CoV-2 infection, from a high of 6.9% in New York City to 1% in the San Francisco Bay Area.<sup>38</sup> These observations have caused scientists and clinicians to conclude that some hospitalizations and deaths predating the identification of the first positive SARS-CoV-2 test in January of 2020 in the United States that were presumed to be influenza may have been co-infections with SARS-CoV-2 or misdiagnosed altogether as influenza.

While hospitalization and death are the most severe outcomes, and so the easiest to quantify, they reflect the “tip of the iceberg,” and undercount infected individuals who are minimally symptomatic, presumed to have the “common cold” but really have COVID-19, and even asymptomatic. In a seminal report from the COVID-19 surveillance office, the authors concluded that “sustained, community transmission had begun before detection of the first two

<sup>38</sup> Havers FP, Reed C, Lim T, Montgomery JM, Klena JD, Hall AJ, Fry AM, Cannon DL, Chiang C-F, Gibbons A, Krapiunaya I, Morales-Betoule M, Roguski K, Rasheed MAU, Freeman B, Lester S, Mills L, Carroll DS, Owen SM, Johnson JA, Semenova V, Blackmore C, Blog D, Chai SJ, Dunn A, Hand J, Jain S, Lindquist S, Lynfield R, Pritchard S, Sokol T, Sosa L, Turabelidze G, Watkins SM, Wiesman J, Williams RW, Yendell S, Schiffer J, Thornburg NJ. Seroprevalence of Antibodies to SARS-CoV-2 in 10 Sites in the United States, March 23-May 12, 2020. *JAMA Internal Medicine*. 2020;180(12):1576-1586.

non-travel related U.S. cases, likely resulting from the importation of a single lineage of virus from China in late January or early February, followed by several importations from Europe.”<sup>39</sup>

#### F. 24HF’s Operations and Insurance Claim

24HF operates health and fitness clubs with facilities spanning the United States, with a particularly high density in major metropolitan areas. **Figure 3** depicts the various locations where 24HF operates one or more locations.



24HF’s clubs are predominantly located in urban and suburban high-density settings, which are areas that 24HF understood experienced high rates of illness from COVID-19 and other respiratory infections.<sup>40</sup> For example, 24HF believed that COVID-19 was present at all its insured locations based on available COVID-19 tracking data such as that provided by John Hopkins University.<sup>41</sup>

Based on information provided to me by the company, as well as conversations with 24HF representatives, I also understand that 24HF’s clubs were highly trafficked in early 2020. For example, **Table 2** summarizes the average number of guests, workouts, and personal training sessions at 284 24HF locations between January 1 and March 13, 2020. The term “Guest” in **Table 2** refers to individuals who are *not* 24HF members, but visited a 24HF location to workout in some capacity, such as on a trial basis. The term “Member Workouts” in **Table 2** refers to workouts performed by 24HF members. “PT” as used in **Table 2** refers to personal training

<sup>39</sup> Team CC-R, Jorden MA, Rudman SL, Villarino E, Hoferka S, Patel MT, Bemis K, Simmons CR, Jespersen M, Iberg Johnson J, Mytty E, Arends KD, Henderson JJ, Mathes RW, Weng CX, Duchin J, Lenahan J, Close N, Bedford T, Boeckh M, Chu HY, Englund JA, Famulare M, Nickerson DA, Rieder MJ, Shendure J, Starita LM. Evidence for Limited Early Spread of COVID-19 Within the United States, January–February 2020. *MMWR Morb Mortal Wkly Rep.* Jun 5 2020;69(22):680-684.

<sup>40</sup> Gottlieb Deposition, pp. 14:22-15:17; Larson Deposition, p. 54:2-19.

<sup>41</sup> See Plaintiff’s Response to Defendant Continental Casualty Company’s First Set of Interrogatories, Interrogatory No. 3.

sessions. Finally, as reported to me by 24HF personnel, members spend on average approximately 40 minutes per workout session at 24HF.

**Table 2: Average Daily Guest Census from 24 Hour Fitness Clubs between January 1, 2020 and March 13, 2020 (73 Days; 284 Clubs)**

<b>284 Applicable Open Clubs from Current Portfolio</b>					
Total Guests	350,089	Total Member Workouts	28,901,941	Total PT Sessions Serviced	258,490
Guest per Day	4,796	Member Workout per Day	395,917	~ PT Session Serviced per Day	3,541
Average Guest per Club per Day	16.9	Average Member Workout per Club per Day	1,394.1	Average PT Session Serviced per Club per Day	12.5

In early 2020, COVID-19 began to affect 24HF's operations and the company made a claim for insurance. For example, I understand that on April 16, 2020, 24HF provided Insurers with information regarding the impact of COVID-19 at its locations in response to Insurers' requests for information. 24HF informed Insurers that it should be "presumed that individuals infected with COVID-19 were present at all of [its] locations" based on the nature of the disease and its presence within the communities in which 24HF operates, and the hazards associated with large groups of people gathering in locations such as its clubs.<sup>42</sup>

In addition, 24HF reported that it had learned of several instances in which team members and/or 24HF patrons with actual or suspected cases of COVID-19 entered its facilities.<sup>43</sup> On May 12, 2020, 24HF further notified the Insurers of twenty-four (24) specific incidents regarding COVID-19 at its locations.<sup>44</sup> These twenty-four (24) incidents detailed situations in which a person who visited a 24HF location tested positive for COVID-19, experienced symptoms of COVID-19, was exposed to COVID-19, was required to quarantine after diagnosis or exposure, and/or was being tested for COVID-19.<sup>45</sup> For example, when reporting these encounters to the insurers, 24HF provided a date on which it learned of the member in a specific location testing positive for COVID;<sup>46</sup> disclosed that a member was required to quarantine due to COVID-19;

<sup>42</sup> ARGUS000446-455; Plaintiff's Response to Defendant Continental Casualty Company's First Set of Interrogatories, Interrogatory No. 3 ("[T]here should be no dispute that COVID-19 and SARS-CoV-2 were present at each of Plaintiff's covered locations at various points in time during the policy period, including the period of time prior to and including March 16, 2020 when all of Plaintiff's clubs were first closed. Furthermore, there should be no dispute that COVID-19 and SARS-CoV-2 were also present at Plaintiff's locations during those interim time periods when Plaintiff's clubs were allowed to reopen and then were subsequently closed again by civil order.").

<sup>43</sup> Ueber Deposition, pp. 71:20-72:4; ARGUS000365-383; ARGUS000446-455; ARGUS000467-479; and ARGUS000521-535; Plaintiff's Response to Insurers' First Set of Interrogatories, Interrogatory No. 7.

<sup>44</sup> ARGUS000467-479.

<sup>45</sup> *Id.*

<sup>46</sup> *Id.*

and/or that a member experienced symptoms of COVID-19 after a person in that individual's household tested positive.<sup>47</sup> Some of the examples even specified that the member had been present at the 24HF just prior to a positive diagnosis.<sup>48</sup>

This is the type of information I would expect a business like 24HF to receive with regard to COVID-19 during the period in question because individuals who visited a 24HF location with COVID-19 are under no obligation to report their diagnosis to the company. Moreover, given the lack of available testing, as detailed above, and the overall reluctance of individuals to report illnesses in general, I would not expect a business to have received detailed information regarding positive test results, dates of exposure to the virus or other more detailed information. In most cases, individuals with COVID symptoms, particularly non-employees who had visited a club, would not have reported anything to the company. For this reason, in my opinion, the information received by 24HF was just the "tip of the iceberg" in terms of incidents at its locations.

From my review of case materials produced in this litigation and discussions with 24HF personnel, 24HF understood COVID-19 to be a highly dangerous and readily transmissible virus.<sup>49</sup> A confluence of factors, including the rapidly evolving nature of the pandemic, numerous reports of the presence of COVID-19 on its premises, and governmental orders<sup>50</sup> necessitating closure, ultimately led 24HF to close all its clubs at 11:59 p.m. on March 16, 2020.<sup>51</sup>

Following the closure of its operations, 24HF began formally tracking COVID-19 related incidents at its clubs, including exposure rates and positive cases, as well as related governmental orders.<sup>52</sup> 24HF implemented a COVID-19 tracking log to monitor the actual or suspected presence of the virus.<sup>53</sup> 24HF further established a Crisis Communications Team to assess the evolution of COVID-19 at its facilities and to ensure the safe operation of its business.<sup>54</sup> In accordance with this, 24HF sent numerous COVID-19 notifications to team members and patrons advising these individuals that certain persons present at a 24HF facility had tested positive for, been diagnosed with, or was otherwise sent home due to COVID-19.<sup>55</sup>

24HF began reopening its facilities in waves.<sup>56</sup> During the process of reopening, it adopted policies and procedures to minimize the presence and transmission of the virus at its locations, as well as to mitigate the significant health risks posed to both team members and patrons. This included initiating a reopening playbook, which set forth processes governing scheduled reopenings, reservation systems, deep cleanings, touchless check-in systems, social distancing

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<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> See Plaintiff's Response to Defendant Continental Casualty Company's First Set of Interrogatories, Interrogatory No. 3.

<sup>50</sup> 24HF\_Production\_0000044-0001962.

<sup>51</sup> Larson Deposition, pp. 29:21-30:12, 77:20-78:14, 112:8-113:16; Gottlieb Deposition, pp. 13:3-14:21; Ueber Deposition, pp. 75:8-76:19; and ARGUS000446-455.

<sup>52</sup> Larson Deposition, pp. 65:11-25, 93:2-24, 101:20-102:2; Gottlieb Deposition, pp. 22:12-23:20; and Piro Deposition, pp. 76:16-78:10.

<sup>53</sup> *Id.*; Larson Deposition, pp. 67:12-68:10.

<sup>54</sup> Gottlieb Deposition, pp. 75:24-76:17.

<sup>55</sup> 24HF\_Production\_0002175-0002589.

<sup>56</sup> 24HF\_Production\_0003406.

measures, spacing of equipment, taking equipment out of service, and signage.<sup>57</sup> Nevertheless, the ever-changing nature of the pandemic forced 24HF to continuously open and close several of its locations throughout the country.<sup>58</sup>

It is my understanding that 24HF sought coverage under its insurance policies for losses suffered due to the pandemic. I also understand from 24HF's counsel that the Insurers contend that, in order to establish the actual presence and spread of COVID-19 at a 24HF location, 24HF must provide, for example: (1) evidence that a person tested positive for COVID-19; (2) evidence of when the person tested positive for COVID-19; (3) evidence that the person who tested positive visited a 24HF location at the time they were positive; (4) information as to where the person who tested positive went before and after testing positive; (5) information as to whether the person who tested positive wore a mask while at the 24HF location; and/or (6) evidence that a surface or piece of equipment tested positive for the presence of COVID-19 or evidence of COVID-19 in the air of a 24HF facility. I further understand from 24HF's counsel that Insurers contend that the Interruption by Communicable Disease Endorsement in policies at issue does not apply to claims stemming from the impact of COVID-19 because, among other things, the policy is "directed to a communicable disease that can actually be tested [for] the actual presence and spread" of the disease.<sup>59</sup>

Given the present understanding of the transmissibility of the virus and the lack of testing available in March 2020 to detect the presence and spread of COVID-19 on both persons and property, from an epidemiological perspective these positions are unreasonable, particularly when considering the nature of 24HF's business operations and the population of asymptomatic persons.

## VI Summary Conclusions

Based on my review of discovery, deposition testimony, conversations with 24HF personnel, as well as other information I have been provided, which is cited herein and listed in **Exhibit B**, I understand that 24HF's decision to close all of its clubs effective March 16, 2020 was based on its belief that COVID-19 was actually present and spreading at all its locations due to the prevalence of COVID-19 within the communities where it operated, and that there was no known method at the time to make its operations safe for its employees and members. In my professional opinion, 24HF's conclusion and beliefs were reasonable and appropriate, and its decision to close its clubs was a necessary reaction to the threat posed by COVID-19.

The basis for these conclusions relies on the criteria for causality cited in **Section III**. Because gathering experimental evidence by manipulating an exposure (e.g., introducing a disease vector such as a virus) and measuring the outcome prospectively (e.g., counting how many became

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<sup>57</sup> 24HF\_Production\_0000001; Larson Deposition, pp. 83:6-85:18; Plaintiff's Response to Defendant Continental Casualty Company's First Set of Interrogatories, Interrogatory No. 7 ("Plaintiff enacted enhanced cleaning procedures for its facilities and fitness equipment, as well as instituted social distancing procedures. Plaintiff also instituted stream-lined and contactless check-in procedures for its customers, and, as applicable, installed Plexiglas barriers to protect its staff and customers when they must interact. Plaintiff memorialized many of these new procedures and protocols in its updated policies and guidelines, which Plaintiff intends to produce.").

<sup>58</sup> 24HF\_Production\_0003406; Plaintiff's Response to Defendant Continental Casualty Company's First Set of Interrogatories, Interrogatory No. 19 ("[C]overed locations were first closed on March 16, 2020 and were reopened on a case-by-case basis, and in some cases were closed and then reopened again.").

<sup>59</sup> Starr 30(b)(6) Deposition, p. 83:2-23.

sick), is oftentimes unethical and largely infeasible in the presence of a public health emergency, scientists rely on causal criteria to make decisions about disease associations. My conclusions in this case that the actions taken by 24HF to close their clubs were justified as a strategy to stop the ongoing spread and prevent further transmission of COVID-19 in their clubs are based on the following agreed upon causal criteria in the field of epidemiology: consistency, analogy, biological plausibility and coherence. Not all criteria must be met in order to determine the likelihood of an association; however, when multiple criteria are present, the argument for causality is strengthened.

1. Consistency. Public health officials noted multiple cases of COVID-19 in densely populated spaces (e.g., outdoor markets in Asia, social gatherings, worksites). These observations that disease was spreading in densely populated spaces were observed consistently across geographic locations internationally and domestically. Consequently, the decision by 24HF to acknowledge the risks posed by continuing to operate densely populated clubs and shut down was reasonable based on the causal criteria of consistency.
2. Analogy. Business shutdowns in the U.S. were based both on consistency and on the causal criteria of analogy. Throughout history, one of the first responses to a communicable disease outbreak is to decrease the risk of exposure to the virus by removing the disease vectors (i.e., people) from the setting. Following this principle, cities and municipalities in Asia and Europe closed businesses and public spaces. Consequently, when the disease was identified in U.S. cities and businesses closed their doors to slow the spread and “flatten the curve,” this reflected the presence of infection in the population. These same disease mitigation strategies were undertaken during the initial SARS outbreak in 2003 and during the Ebola outbreaks in West Africa in 2014. Again, the decision by 24HF to shut down its business operations followed the principle of analogy that by de-densifying public settings, they could curtail ongoing spread and reduce the likelihood of further disease spreading in its clubs.
3. Biological Plausibility. That COVID-19 was spreading through person-to-person transmission was biologically plausible given the similarity of the SARS-CoV-2 virus to other respiratory viruses that cause the common cold, influenza and the initial SARS virus. Small virus particles are propelled through ordinary respiration (breathing) and propelled even further with vigorous respiration including exercising, coughing and sneezing. These viral particles are inhaled by people and animals breathing within the same geographic unit of space. Theoretically, if these viral particles remain alive on surfaces, they can additionally infect individuals who touch these surfaces and transfer the virus to their own respiratory track through the mouth, nose or even the eyes. Thus, the decision by 24HF to close was based on the biological plausibility that individuals inside their clubs were spreading the SARS-CoV-2 virus that causes COVID-19 by breathing together in close proximity.
4. Coherence. Once the SARS-CoV-2 virus was sequenced and could be studied further, there were experiments conducted to determine how long it could live on surfaces. Based on the observations that it could survive for hours to days (depending on the surface), scientists applied the criteria of coherence between laboratory and epidemiological evidence to suggest surface cleaning as a route of transmission. Unfortunately, however, it would have been impossible for 24HF to determine which surfaces in a given fitness

club were affected by SARS-CoV-2 and apply cleaning strategies alone to reduce transmission. Consequently, other mitigation strategies including shutdowns were more effective and the best possible decision at the time and in hindsight.

Much attention early on in the pandemic involved cleaning as a strategy to reduce transmission from surface to individual. A report in June 2020 indicated that the virus could remain alive for days on surfaces, and this sustained the commitment towards cleaning as a public health prevention strategy.<sup>60</sup> Whether or not surfaces containing the virus could readily be identified and subject to being cleaned, and what cleaning methods are appropriate, the CDC subsequently reported that surface transmission (i.e., “fomite”) is not the sole source of infection.<sup>61</sup> Instead, eliminating or decreasing the density of patrons breathing near one another indoors is the most effective strategy to prevent transmission. The closure of 24HF’s facilities in March 2020 appropriately and presciently adhered to best practices to prevent transmission that have continued to evolve but maintain that the central focus should be reducing opportunities for people to congregate indoors given airborne infectivity.

Tracking asymptomatic spread of the illness also was not possible in 2020 because there was limited testing capacity. However, asymptomatic and minimally symptomatic spread had been observed in other settings (Germany) and is highly likely to occur in someone feeling well enough to exercise.<sup>62</sup> The tests that were available were reserved for symptomatic individuals who presented in a hospital setting or individuals who had known exposures to a positive case. This scenario is very different than it is now in 2022, and even when sports leagues reopened in the summer and fall of 2020, repeated serial testing of asymptomatic persons was possible. Around that same time, there was considerable debate about the plausibility of asymptomatic spread within the CDC and WHO, who argued that prodromal or “pre-symptomatic” spread was more likely than asymptomatic spread. There was general agreement that an individual could still transmit the virus even if they were not actively showing symptoms but fell in the “prodromal” stage before symptoms appeared.

As indicated above, in my professional opinion, it was in 2020, and is today, reasonable for 24HF to conclude that COVID-19 was actually present and spread at all of its locations in March 2020. The decision by 24HF to close its locations for the reasons summarized was also reasonable and appropriate. Fitness clubs are high-exposure locations, where individuals congregate for longer periods in close quarters and undoubtedly release respiratory particles when exerting themselves during physical activities. The clientele attending exercise facilities, like 24HF club members, were at uniquely high risk of continuing to spread and contract SARS-CoV-2 because exercising

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<sup>60</sup> van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, Tamin A, Harcourt JL, Thornburg NJ, Gerber SI, Lloyd-Smith JO, de Wit E, Munster VJ. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *N Engl J Med*. Apr 16 2020;382(16):1564-1567.

<sup>61</sup> Meyerowitz EA, Richterman A, Gandhi RT, Sax PE. Transmission of SARS-CoV-2: A Review of Viral, Host, and Environmental Factors. *Ann Intern Med*. Jan 2021;174(1):69-79; Kampf G, Bruggemann Y, Kaba HEJ, Steinmann J, Pfaender S, Scheithauer S, Steinmann E. Potential sources, modes of transmission and effectiveness of prevention measures against SARS-CoV-2. *J Hosp Infect*. Dec 2020;106(4):678-697; Centers for Disease Control and Prevention. Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments. Accessed August 10, 2022. <https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/surface-transmission.html>.

<sup>62</sup> Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, Zimmer T, Thiel V, Janke C, Guggemos W, Seilmaier M, Drosten C, Vollmar P, Zwirglmaier K, Zange S, Wolfel R, Hoelscher M. Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *N Engl J Med*. Mar 5 2020;382(10):970-971.

requires deep inhalation and exhalation to achieve adequate oxygen to perform. Exhalation by infected individuals and subsequent inhalation by uninfected individuals is the scientifically agreed upon primary route of transmission of SARS-CoV-2.

Further, due to the fact that individuals with the common cold, flu and other respiratory illnesses undoubtedly visited each 24HF location during the cold and flu season, it would have been untenable for 24HF to stay open as discussed. Surface cleaning would have been ineffective because there were too many surfaces to disinfect and no ability to determine which surfaces had SARS-CoV-2 on them. In the absence of available testing, it would have been impossible to discern infection from SARS-CoV-2 from the many common illnesses circulating at this time of year. Given that the average individual experiences 2-3 colds per year, there would have been many people with respiratory illnesses frequenting 24HF clubs during the winter and spring of 2020. To remain open would have run the risk of spreading SARS-CoV-2, particularly since most fitness centers were located in municipalities where community rates of COVID-19 were rising at a near exponential rate during that time.

24HF locations generally were in urban and suburban settings, in the vicinity of hospitals and other high-risk locations, with high rates of illness from COVID-19 and other respiratory illnesses present (**Figure 3**). Additionally, the facilities in those locations were highly trafficked.

**Table 2** summarizes the average number of guests, workouts and personal training sessions accessed between January and March 2020. As reported to me by the company, members spend on average 40 minutes per session exercising. The volume of patrons and the time spent inside the clubs support 24HF's conclusion that COVID-19 was present and spreading at each of the 24HF locations up until the time the company decided to close in March 2020. In addition, there is no doubt that individuals with unspecified respiratory illnesses were present and these individuals had to be considered as having COVID-19. Without taking steps to close the clubs, it is reasonable to presume that COVID-19 would have continued to be present and spread, notwithstanding whatever cleaning regimen the company could have utilized. This is further evidenced by the fact that in some jurisdictions clubs were allowed to reopen but then were ordered to be closed again after a relatively short time period due to the continued re-introduction and spread of the virus.

# **Exhibit A**

## **Curriculum Vitae for**

## **Mercedes R. Carnethon,**

## **Ph.D.**

October 6, 2022

**Mercedes R. Carnethon, Ph.D., FAHA**

Business Address: 680 N Lake Shore Drive, Suite 1400  
Chicago, IL 60611

Business Phone: (312) 503-4479  
Email: carnethon@northwestern.edu

**EDUCATION**

<u>Date</u>	<u>Institution (Location)</u>	<u>Degree</u>	<u>Discipline</u>
<u>Awarded</u>			
June 1996	Stanford University (Palo Alto, CA)	A.B. (w/ honors)	Human Biology
Dec 1998	University of North Carolina at Chapel Hill (Chapel Hill, NC)	MSPH	Epidemiology
Dec 2000	University of North Carolina at Chapel Hill (Chapel Hill, NC)	Ph.D.	Epidemiology

**TRAINING***Postdoctoral Training*

<u>Dates</u>	<u>Institution (Location)</u>	<u>Title</u>	<u>Field</u>
2000-2002	Stanford University School of Medicine, Stanford Prevention Research Center (Palo Alto, CA)	Postdoctoral Fellow	Cardiovascular Disease Epidemiology and Prevention

*Leadership Training*

<u>Dates</u>	<u>Institution</u>
2007-2008	Management Skills for Innovative University Leaders by the Kellogg School of Management at Northwestern University
2013-2014	Executive Leadership in Academic Medicine (ELAM), Drexel University College of Medicine
2015-2016	Committee on Institutional Cooperation (now BIG Ten Academic Alliance) Academic Leadership Program

**LICENSURE / CERTIFICATION**

N/A

**ACADEMIC APPOINTMENTS**

<u>Dates</u>	<u>Title</u>	<u>Institution</u>	<u>Department</u>
2019	Professor	Feinberg School of Medicine, Northwestern University	Medicine (Pulmonology and Critical Care)
2018	Mary Harris Thompson (endowed professorship)		Preventive Medicine
2018	Professor	Feinberg School of Medicine, Northwestern University	Preventive Medicine
2010-2018	Associate Professor	Feinberg School of Medicine, Northwestern University	Preventive Medicine
2002-2010	Assistant Professor	Feinberg School of Medicine, Northwestern University	Preventive Medicine

*Administrative appointments*

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2009-2013	Director, Master of Science in Epidemiology and Biostatistics, Program in Public Health, Feinberg School of Medicine, Northwestern University
2010-2014	Associate Chair for Faculty Development and Mentoring, Department of Preventive Medicine, Feinberg School of Medicine, Northwestern University
2012-2019	Director, Division of Epidemiology, Department of Preventive Medicine, Feinberg School of Medicine, Northwestern University
2014-Present	Vice Chair, Department of Preventive Medicine
2020-Present	Co-Director, Center on Education and Career Development, Northwestern University Clinical and Translational Sciences (NUCATS) Institute

## HONORS AND AWARDS

### A. Elected Society Memberships

2001	Delta Omega, the Honorary Public Health Society, University of North Carolina at Chapel Hill School of Public Health, Theta Chapter
2006	American Heart Association (AHA) Council on Epidemiology and Prevention and Council on Lifestyle Medicine (FAHA)
2012	Fellow, Institute of Medicine Chicago (IOM-Chicago)

### B. International/National/Regional

2002	Finalist, Jeremiah and Rose Stamler Award for New Investigators at the American Heart Association Council on Epidemiology Annual Meeting, Honolulu HI
2002	First prize poster, Society for Epidemiologic Research Annual Meeting, Palm Desert, CA
2008	Kaiser Permanente Division of Research Outstanding Paper Award: "A 20 Year Prospective Study of Childbearing and Incidence of Diabetes in Young Women: CARDIA" Published in Diabetes. Lead author: Erica P. Gunderson (Role = Co-author)
2011	Special Recognition Award, Council on Epidemiology and Prevention, American Heart Association, Scientific Sessions 2011
2022	Commencement keynote speaker at the University of Pittsburgh Institute for Clinical Research and Education graduation ceremony

### C. University

1996	Graduation speaker, Program in Human Biology, Stanford University
2001	Katherine McCormick Fund for women, Stanford University School of Medicine, Travel Award
2014	Outstanding Service Award, The Graduate School, Northwestern University
2018	Feinberg School of Medicine, Faculty Mentor of the Year

## INSTITUTIONAL SERVICE (Committees, Councils, Task Forces)

### A. University

2007-2009	One Northwestern, Faculty Committee
2010-2011	Search Committee for Dean of Feinberg School of Medicine, Northwestern University
2011-2013	University Diversity Council, Committee on Faculty Recruitment (Co-Chair)
2012-2013	Search Committee for Chair of Neurosurgery
2014-2015	Search Committee for Chair of Pediatrics
2016	Search Committee for Director of the Institute for Public Health and Medicine
2013-2018	University Diversity Council
2015-2019	Excellence in Diversity Committee
2015-2017	Faculty Mentoring Initiative Committee
2016-2017	Search Committee for Chair of Pediatric Psychiatry
2016-Present	Provost's Council on Women
2016-2018	Provost's Council on Women, Subcommittee Chair Faculty Development and Mentoring

2020	Search Committee for Chair of Pediatrics
2022	Search Committee for the Chair of the Department of Medical Social Sciences

**B. School**

2003– 2004	Liaison Committee on Medical Education, Faculty Committee. Medical school accreditation committee.
2005-2008	Obesity Research Center Initiative Steering Committee
2012- Present	Mentor training workshop facilitator, Northwestern University Clinical and Translational Science Institute
2013- 2014	Program Lead, Program on Epidemiologic Approaches to Behavior Change, Center for Behavior and Health, Institute for Public Health and Medicine
2014- 2016	Steering Committee Patient Centered Outcomes Training Award, Department of Medical Social Sciences (MSS)
2014- Present	Steering Committee KL2 (junior faculty) and TL1 (postdoctoral fellow) award, Northwestern University Clinical and Translational Science (NUCATS) Institute
2015- Present	Steering Committee Office of Diversity and Inclusion
2016	Grant Review NUCATS KL2 Awards
2017	Grant reviewer, Institute for Public Health and Medicine (IPHAM) Center for Bioethics
2017	Vascular Surgery Postdoctoral Training Program, Steering Committee
2018- Present	Steering Committee, NW University Program in Endocrinology, Diabetes and Hormone Action (T32 DK007169, PI: Bass)
2018-Present	General Internal Medicine Fellowship, Leadership Committee
2018-2019	Task Force on Diversity Recruiting, Hiring and Promotions
2018-2019	Appointments Promotion and Tenure Committee Feinberg School of Medicine
2020-Present	Associate Chair, Appointments, Promotion and Tenure Committee, Feinberg School of Medicine

**C. Department**

2002 –2004	Masters of Public Health Program, Curriculum Committee
2002 –2004	Masters of Public Health Program, Diversity Committee
2004 –2008	Masters of Public Health Program, Diversity Committee (Chair)
2006 –2009	Masters of Public Health Program, Delta Omega Honorary Public Health Society, Beta Eta Chapter (Secretary)
2006 –2009	Masters of Science in Epidemiology and Biostatistics Advisory Committee
2009 - Present	Program in Public Health Diversity Committee (Member)
2009 -2011	Program in Public Health Curriculum Committee (Chair)
2009-Present	Program in Public Health, Delta Omega Honorary Public Health Society, Beta Eta Chapter (Secretary)
2018-	Internal Advisory Committee, Multidisciplinary Training Program in Digital Mental Health (T32 MH115882 PI: Mohr)
2019-	Department Wellness Committee

**PUBLIC/COMMUNITY SERVICE**

2012- Present	Steering Committee, Northwestern Medicine Scholars Partnership with George Westinghouse High School
2012	Program Co-Chair, Summer Cardiology Curriculum for Northwestern Medicine Scholars
2016	Program Chair, Summer Public Health Advocacy Curriculum for Northwestern Medicine Scholars Partnership
2017-2019	Youth T-Ball Coach, Hyde Park Kenwood Legends
2019-	Assistant Coach, Track and Field, the Frances Xavier Warde School

2020-2022 Health Task Team Member, The Frances Xavier Warde School

#### **PARTICIPATION IN PROFESSIONAL SOCIETIES AND EXTRAMURAL ORGANIZATIONS**

##### **A. Professional Society Memberships**

2003 - 2008	Epidemiology Liaison, AHA Council on Nutrition, Physical Activity and Metabolism, Committee on Nutrition
2003 - 2006	AHA Council on NPAM representative, Industry Nutrition Advisory Panel (Member)
2003 - 2009	American Heart Association, Council on Epidemiology and Prevention, Committee on Minorities
2005 - 2007	American Diabetes Association Spring Program Committee Council on Epidemiology and Statistics
2008 - 2010	AHA Council on Epidemiology and Prevention Statistics Committee
2009 - 2011	AHA Science Advisory Coordinating Committee
2009 - 2011	AHA Executive Database Steering Committee
2006 - 2011	AHA Council on Epidemiology and Prevention Leadership Committee
2010 - 2011	AHA Committee for Scientific Sessions Program
2010 - 2013	National Institutes of Health (NIH), Sleep Disorders Research Advisory Board Member
2011 - 2012	AHA Research Committee
2011- 2016	AHA Midwest Research Council
2011 - 2015	AHA Council on Nutrition, Physical Activity and Metabolism, Physical Activity Committee
2011 - 2013	AHA Council on Nutrition, Physical Activity and Metabolism, Leadership Committee
2012 – Present	Sleep Medicine Society, Associated Professional Sleep Societies
2014 – 2015	American Association of Medical Colleges (AAMC), Planning Committee for Minority Midcareer Faculty Development Workshop
2014- 2016	AHA Mission Metrics Committee
2014- 2016	AHA Worksite Wellness Steering Committee
2015- 2016	AHA Diversity Leadership Committee
2014- 2017	AAMC Planning Committee for the Early Career Faculty Development Workshop
2014- Present	AHA Strategically Focused Research Network Steering Committee
2015- 2019	AHA Council on Epidemiology and Prevention, Nominating Committee
2016- 2018	AHA Council on Epidemiology and Lifestyle, Lifelong Learning Program Committee
2016- 2018	AHA Research Committee, Funding Subcommittee
2018- Present	AHA Women in Science and Medicine Task Force
2017- Present	AHA Council on Lifestyle, Obesity Subcommittee
2019- 2020	AHA Diversity Research Pipeline Task Force
2019- Present	Chicago Metropolitan Board of the American Heart Association
2021-	Member, NHLBI Board of Scientific Counselors

##### **B. Leadership and Service (leadership positions held, committee service, etc.)**

2006 - 2008	Vice Chair, AHA Interdisciplinary Council on Prevention
2007 - 2010	Chair, Physical Activity/Anthropometry Committee, HCHS/SOL
2008 - 2011	Chair, AHA Interdisciplinary Council on Prevention
2008 - 2011	Chair, AHA Council on Epidemiology and Prevention Publishing Committee
2009 - 2016	Co-Chair, Diabetes and Obesity working group, CARDIA Study
2016- 2018	Observational Studies Monitoring Board, SEARCH for Diabetes in Youth Study, NIDDK
2018- 2019	Chairperson, Observational Studies Monitoring Board, SEARCH for Diabetes in Youth Study
2013 - 2018	Co-Chair Diabetes and Obesity Working Group, Jackson Heart Study
2019- 2021	Vice Chair, AHA Council on Lifestyle, Obesity Subcommittee
2021-	Chair, AHA Council on Lifestyle, Obesity Subcommittee
2022-	Board President, Chicago Metropolitan Board of the American Heart Association
2022-	Vice Chair, AHA Council on Epidemiology and Prevention

### C. Other Professional Service

2012- Present External Advisory Board, Cardiovascular Epidemiology Training Grant (T32HL007055 PI: Rosamond)

2017- Present External Advisory Board, Cardiovascular Disease Epidemiology & Prevention (T32HL007779 PI: Folsom)

2018 NIH/NHLBI Workshop to Promote Diversity Training and Initiatives, Invited Speaker

2018 External Evaluation Panel, Treatment Options for type 2 Diabetes in Adolescents and Young Adults (TODAY) Study

2020 NIH/NHLBI Search Committee for the Director of the Jackson Heart Study

2021 NIH/NEI Ad Hoc Review for Intramural Faculty

### EDITORIAL AND MANUSCRIPT REVIEW RESPONSIBILITIES

#### *Editorial Responsibilities*

2014 Associate Editor, *Current Nutrition Reports*

2011 - 2016 Guest Editor, *Circulation: Journal of the American Heart Association*

2016 – 2017 Editorial Board (Associate Editor), *Circulation: Journal of the American Heart Association*

2019- Associate Editor, *Circulation: Journal of the American Heart Association*

2020- Guest Editor-in-Chief, *Circulation*. Special Issue on Disparities in Cardiovascular Diseases

2022- Guest Editor-in-Chief, *Circulation*. Special issue on heart disease in women

#### *Ad Hoc Manuscript Review*

American Journal of Epidemiology; American Journal of Cardiology; American Journal of Preventive Medicine; Journal of Human Hypertension; Annals of Epidemiology; Annals of Internal Medicine; Archives of Internal Medicine/ JAMA-Internal Medicine; Circulation; Diabetes; Diabetes Care; Diabetologia; Health Education Research; Journal of Adolescent Health; Journal of the American College of Cardiology; Journal of the American Medical Association (JAMA); Obesity; Obesity Research; Psychosomatic Medicine; Journal of Diabetes; New England Journal of Medicine; Journal of Physical Activity and Public Health; JAMA-Cardiology; Journal of Sleep Medicine; Journal of Diabetes Complications; PLOS One; Sleep Health; Sleep Medicine; Sleep; Frontiers in Public Health

### GRANT REVIEW RESPONSIBILITIES

2004 Canadian Foundation for Innovation (ad hoc review)

2006 South African Foundation for Medical Research (ad hoc review)

2006 Yale University Clinical Research Grant Programs (ad hoc review)

2007 National Heart Lung and Blood Institute/National Institutes of Health (NHLBI/NIH) Special Contract Review

2009 NIH American Re-investment and Recovery Act (ARRA) Grant Review (Stage 1 review)

2010 NIH/Center for Scientific Review (CSR) Kidney, Nutrition, Obesity and Diabetes/ Cardiovascular and Sleep Epidemiology Conflict Special Emphasis Panel (February)

2010 Kidney Nutrition Obesity and Diabetes, at-large member (June 2010)

2010-2014 AHA Grant Review, Genomics Translational Biology and Observational Epidemiology (GTOE) Review Panel, member

2014 AHA Grant Review, GTOE Review Panel, Co-Chair of Review Panel

2014-2018 NIH Center for Scientific Review, Kidney Nutrition Obesity and Diabetes (KNOD), standing member

2015-2017 NIH/NHLBI Sponsored Mentored Career Development Awards to Promote Diversity, Ad hoc review in 2015 (July), 2017 (March and July)

2018-2019 NIH Center for Scientific Review Kidney Nutrition Obesity and Diabetes (KNOD), Chairperson

2020 NIH Special Emphasis Panel Disparities Elimination through Coordinated Interventions to Prevent and Control heart and Lung Disease Risk (DECIPHER)

2020	Centers for Disease Control and Prevention DP20-002 Natural Experiments of the Impact of Population-targeted Policies to Prevent Type 2 Diabetes and Diabetes Complications
2021	Mobile technology interventions to reduce disparities, Ad Hoc Review NIH, Chairperson

**GRANT AWARDS****A. Current**

**Agency:** NIH/NHLBI  
**ID#:** 1R01HL125423-01A1  
**Title:** *Determinants and Cardiovascular Consequences of Disparities in Sleep and Circadian Rhythms between black and white adults*

**Principal Investigator:** Carnethon, M (contact)/ Knutson KL  
**Role on project:** MPI  
**Percent effort:** 20%  
**Project period:** 08/01/2020-03/31/2024

**Agency:** NIH/ NHLBI  
**ID#:** U01HL146408  
**Title:** *The American Lung Association (ALA) Lung Health Cohort*

**Principal Investigator:** Kalhan R (contact), Washko G, **Carnethon M** and Sugar E  
**Role on project:** MPI  
**Percent effort:** 15%  
**Project period:** 06/17/2019- 03/31/2025

**Agency:** NIH/ NIA  
**ID#:** R01AG059291  
**Title:** *Disparities in Sleep and Cognitive function in Older Adults (DISCO): An Epidemiologic Study*

**Principal Investigator:** Knutson KL (contact) and **Carnethon MR**  
**Role on project:** MPI  
**Percent effort:** 15%  
**Project period:** 04/01/2019- 03/31/2023

**ID#:** R01MD011570-03  
**Agency:** NIH/NIMHD  
**Title:** *ELLAS: Environment, Leiomyomas, Latinas and Adiposity Study*

**Principal Investigator:** Marsh, E  
**Role on project:** Consortium PI  
**Percent effort:** 5%  
**Project period:** 02/01/17-01/31/22 (in NCE)

**Agency:** NIH/NHLBI  
**ID#:** HHSN268201500003I  
**Title:** *Multi-Ethnic Study of Atherosclerosis (MESA): Field Center*

**Principal Investigator:** McClellon, R/ Allen N  
**Role on project:** Co-investigator  
**Percent effort:** 5%  
**Project period:** 08/15/15 – 08/14/23

**Agency:** NIH/NHLBI

**ID#:** HHSN268201800003I  
**Title:** *Coronary Artery Risk Development in Young Adults (CARDIA) Study – Chicago Field Center*  
**Principal Investigator:** Lloyd-Jones, D (contact) and Carnethon M  
**Role on project:** MPI  
**Percent effort:** 10%  
**Project period:** 07/01/18 – 06/30/23

**Agency:** NIH/NHLBI  
**ID#:** 1R01HL149866  
**Title:** *Cardiovascular Health Associations with Minority Stress: Biobehavioral Evaluations and Reported Sociopsychological outcomes by SOGI status (CHAMBERS)*  
**Principal Investigator:** Beach, L.  
**Role on project:** Co-Investigator  
**Percent effort:** 1%  
**Project period:** 07/01/2020-06/31/2025

**Agency:** American Lung Association  
**ID#:** N/A  
**Title:** *COVID-19 in Young Adults in the Lung Health Cohort*  
**Principal Investigator:** Kalhan, R  
**Role on project:** Co-Investigator  
**Percent effort:** 1%  
**Project period:** 12/01/20-12/31/23

**Agency:** NIH/NHLBI  
**ID#:** 1R01HL149796  
**Title:** *Young Adult and Midlife Transitions in Physical Activity and Sedentary Behavior with Heart Failure Risk and Progression: Coronary Artery Risk Development in Young Adults*  
**Principal Investigator:** Gabriel, KP  
**Role on project:** Co-Investigator/Subcontract PI  
**Percent effort:** 5%  
**Project period:** 07/01/2020-06/31/2024

#### *Training Grants and Mentoring Awards*

**Agency:** NIH/ National Center for Advancing Translational Sciences  
**ID#:** 5UL1TR001422  
**Title:** *Northwestern University Clinical and Translational Science Institute (NUCATS)*  
**Principal Investigator:** D'Aquila, R  
**Role on project:** Co-Director Center for Education and Career Development  
**Percent effort:** 15%  
**Project period:** 09/01/19-08/31/24

**Agency:** NIH/ NHLBI  
**ID#:** T32HL069771  
**Title:** *Research Training in CVD Epidemiology and Prevention*  
**Principal Investigator:** Carnethon MR

**Role on project:** PI  
**Percent effort:** 10% (Cost Share)  
**Project period:** 02/01/2019-1/31/2024

**Agency:** NIH/ NHLBI  
**ID#:** K01 HL147995  
**Title:** *ACHIP-ACES and Cardiometabolic Health in Pediatrics: Using a Coping and Stress Reduction Intervention to Reduce Cardiometabolic Risk in Adolescents with Adversity*

**Principal Investigator:** Heard-Garris, Nia  
**Role on project:** Secondary Mentor  
**Percent effort:** 5% (No salary support)  
**Project period:** 07/1/2019 – 06/30/2024

**Agency:** NIH/ NHLBI  
**ID#:** K01HL145345  
**Title:** *Quantifying compliance to the new 2017 hypertension guidelines and investigating the association between guideline compliance and patients' trajectory of blood pressure*

**Principal Investigator:** Tedla, Yacob  
**Role on project:** Secondary Mentor  
**Percent effort:** 5% (No salary support)  
**Project period:** 02/01/2020- 01/31/24

**Agency:** NIH/NHLBI  
**ID#:** 1K01HL152009  
**Title:** *Predicting risk of cardiotoxicity among young and emerging adult breast cancer patients from treatment to survivorship*

**Principal Investigator:** Hibler, E.  
**Role on project:** Primary Mentor  
**Percent effort:** 5%  
**Project period:** 04/01/2020-03/31/2025

**Agency:** NIH/NHLBI  
**ID#:** K01HL149987  
**Title:** *Developing an intervention targeting sleep disturbances among bereaved individuals*

**Principal Investigator:** Chirinos Medina, D  
**Role on project:** Primary Mentor  
**Percent effort:** 5%  
**Project period:** 07/01/2020-06/31/2025

**Agency:** NIH/NIDDK  
**ID#:** 2P30DK092949  
**Title:** *Chicago Center for Diabetes Translation Research*

**Principal Investigator:** Chin, Marshall and Ackermann R  
**Role on project:** Co-Investigator Pilot & Feasibility Core  
**Percent effort:** 1%  
**Project period:** 08/01/2021-

## B. Pending

**Agency:** NIH/NHLBI  
**ID#:**  
**Title:** *Association of obesity and nutrition on lung health: Lung Health Cohort*  
**Principal Investigator:** Bose, Sonali and Hanson, Corrine (MPIs)  
**Role on project:** Co-Investigator  
**Percent effort:** 5%  
**Project period:** 12/01/2022-11/30/2026

**Agency:** NIH/NHLBI  
**ID#:** K99HL168338A  
**Title:** *Developing, Validating and Implementing an Epidemiological Instrument to Assess the Effect of Resistance Training on Measures of Cardiometabolic Disease*  
**Principal Investigator:** Booker, Robert  
**Role on project:** Primary Mentor  
**Percent effort:** 5%  
**Project period:** 12/01/2022-11/30/2026

### C. Past

**Agency:** NIH/NHLBI  
**ID#:**  
**Title:** *Third Coast HIV-related Heart, Lung, Blood, and Sleep K12 Scholars Program: TC-HLBS K12*  
**Principal Investigator:** Schneider J and Ardehali H  
**Role on project:** Executive Committee/Mentor  
**Percent effort:** 5%  
**Project period:** 08/01/2018-7/30/2022

**Agency:** NIH/NICHD  
**ID#:** R01HD088638  
**Title:** *Study of Ovarian Aging and Reserve in Young Women (SOAR)*  
**Principal Investigator:** Marsh, E  
**Role on project:** Consortium PI  
**Percent effort:** 5%  
**Project period:** 02/01/17-01/31/22 (in NCE)

**Agency:** AHA  
**ID#:**  
**Title:** *Northwestern University Strategically Focused Vascular Disease Research Network*  
**Principal Investigator:** McDermott, M  
**Role on project:** Training Director  
**Percent effort:** 5% (Cost Share)  
**Project period:** 04/01/2018 – 03/31/2022

**Agency:** NIH/NIDDK  
**ID#:** P30  
**Title:** *George M. O'Brien Kidney Core Center at Northwestern*  
**Principal Investigator:** Quaggin, S  
**Role on project:** Co-Investigator  
**Percent effort:** 4%

**Project period:** 08/01/2018-

**Agency:** NIH/ NHLBI  
**ID#:**  
**Title:** *Depressive Symptom Presentation and Course, Cardiovascular Events and Mortality in the Coronary Artery Risk Development in Young Adults Study*

**Principal Investigator:** Chirinos Medina, Diana  
**Role on project:** Primary Mentor  
**Percent effort:** 5% (No salary support)  
**Project period:** 02/01/2019- 01/31/21

**Agency:** NIH/NIDDK  
**ID#:** 2R01DK081371-06  
**Title:** *Strength Training Regimen fOr Normal weiGht Diabetics (STRONG-D)*

**Principal Investigator:** Palaniappan, L  
**Role on project:** Consultant  
**Project period:** 04/15/2014 - 04/14/2019 NCE

**Agency:** NIH/NIDDK  
**ID#:** R01 DK106201-01  
**Title:** *Pregnancy-Related Risk Factors and Glucose Intolerance in Women during Midlife*

**Principal Investigator:** Gunderson, E  
**Role on project:** Consortium PI  
**Percent effort:** 2%  
**Project period:** 06/01/15 – 06/30/20

**Agency:** American Heart Association  
**ID#:** 15SFDRN25080331  
**Title:** *Phosphate and FGF 23: Dietary and Molecular Mediators of Health disparities in Cardiovascular and Kidney diseases*

**Principal Investigator:** Wolf M and Carnethon M  
**Role on project:** Consortium PI/ Center Director  
**Percent effort:** 10%  
**Project period:** 06/01/15 – 05 /31/19

**Agency:** NIH/ NHLBI  
**ID#:** K01 HL133531  
**Title:** *A Systems Science Approach to Understanding Racial/Ethnic Disparities in Obesity*

**Principal Investigator:** Kershaw, K  
**Role on project:** Primary Mentor  
**Percent effort:** 5% (No salary support)  
**Project period:** 08/15/2016 – 05/31/2020

**Agency:** American Heart Association  
**ID#:** 15SFDRN25550149  
**Title:** *Contribution of Fibroblast Growth Factor 23 (FGF23) to Racial Disparities in Left Ventricular Mass and Albumin/Creatinine Ratio*

**Principal Investigator:** Carnethon, M  
**Percent effort:** 20%

**Project period:** 06/01/15 – 05/31/2020

**Agency:** NIH/NHLBI

**ID#:** 1R56HL125423-01A1

**Title:** *10-Year Changes on Objective-Measured Physical Activity and Sedentary Behavior in the CARDIA Cohort*

**Principal Investigator:** Sidney, S/ Gabriel K

**Role on project:** Consortium PI

**Percent effort:** 2%

**Project period:** 09/15/15-08/31/17

**Agency:** NIH/NIDDK

**ID#:** 1 R21 DK112066-01

**Title:** *Improving Diabetes Risk Assessment and Screening in Minority-Predominant Community Health Center Patients*

**Principal Investigator:** O'Brien M

**Role on project:** Co-investigator

**Percent effort:** 5%

**Project period:** 09/20/16 – 08/31/18

**Agency:** NIH/NHLBI

**ID#:** HHSN26820130047C

**Title:** *Jackson Heart Study Field Center*

**Principal Investigator:** Correa, A

**Role on project:** Consortium PI

**Percent effort:** 10%

**Project period:** 08/16/13 – 8/12/18 (NCE)

**Agency:** NIH/NHLBI

**ID#:** HHSN268201300027C

**Title:** *Coronary Artery Risk Development in Young Adults (CARDIA) Study – Chicago Field Center*

**Principal Investigator:** Lloyd-Jones, D

**Role on project:** Co-Principal Investigator

**Percent effort:** 5%

**Project period:** 07/01/13 – 06/30/18

**Agency:** American Heart Association

**Title:** *Northwestern University Strategically Focused Prevention Research Network*

**Principal Investigator:** Greenland P

**Role on project:** Training Director

**Percent effort:** 10%

**Project period:** 07/01/14 – 06/30/18

**Agency:** NIH/NHLBI

**ID#:** 1R01HL102130

**Title:** *Hispanic Community Children's Health, Study of Latino Youth: SOL-Youth*

**Principal Investigator:** Carnethon M/ Isasi C, Bangdiwala S, Delamater A, Ayala G

**Role on project:** Multiple PI

**Percent effort:** 15%

**Project period:** 04/01/2011-11/30/2016

**Agency:** NIH/ NHLBI

**ID#:** 1R01 HL092140-01A2

**Title:** *Autonomic, Endothelial and Inflammatory Correlates of Sleep Duration*

**Principal Investigator:** Carnethon M

**Percent effort:** 20%

**Project period:** 07/01/2009 – 06/30/2015

**Agency:** NIH/NIDDK

**ID#:** 1R21DK082903 - 01A1

**Title:** *Epidemiologic Studies of Type 2 Diabetes in Normal Weight Adults*

**Principal Investigator:** Carnethon M

**Percent effort:** 20%

**Project period:** 7/27/09-6/30/12

**Agency:** NIH/ NIA

**ID#:** R56AG05291

**Title:** *An Epidemiologic Study of Disparities in Sleep and Cognitive Outcomes (DISCO)*

**Principal Investigator:** Knutson KL/ Carnethon MR

**Role on project:** Multiple PI

**Percent effort:** 15%

**Project period:** 09/15/2018-8/31/2019

**Agency:** NIH/NHLBI

**ID#:** R56HL125423-01A1

**Title:** *10-Year Changes in Objectively-Measured Physical Activity and Sedentary Behavior in the CARDIA Cohort*

**Principal Investigator:** Sidney S

**Role on project:** Consortium PI

**Percent effort:** 2%

**Project period:** 9/1/15 – 8/1/17

**Agency:** NIH/NHLBI

**ID#:** RC2 HL101649-01

**Title:** *Ancillary to HCHS/SOL: Sociocultural Factors and CVD risk/prevalence in Hispanics*

**Principal Investigator:** Gallo L and Penedo F

**Role on project:** Consortium PI

**Percent effort:** 20%

**Project period:** 9/30/09 – 7/31/12

**Agency:** NIH/NHLBI

**ID#:** R01 HL078972-02

**Title:** *20-Year Changes in Fitness & Cardiovascular Disease Risk*

**Principal Investigator:** Sidney S

**Role on project:** Consortium PI

**Percent effort:** 25%

**Project period:** 12/01/2005 – 11/30/2008

**Agency:** NIH/ NHLBI

**ID#:** 5 R01 HL078972-03  
**Title:** *Body Mass & Lung Function: Impact of Physical Activity & Fitness in Young Adults*  
**Principal Investigator:** Sidney S/ Hankinson A  
**Role on project:** Consortium PI/ Mentor for Diversity Supplement  
**Percent effort:** No salary support

**Agency:** NIH/ NIA  
**ID#:** 5 P01 AG011412-11  
**Title:** *Sleep and Weight Gain in Midlife: An Epidemiologic Study*  
**Principal Investigator:** Van Cauter E/ Liu K  
**Role on project:** Co-investigator  
**Percent effort:** 5%  
**Project period:** 04/01/2003 – 03/31/2009

**Agency:** Northwestern University Community Engaged Research Center Faculty Development Award  
**ID#:** N/A  
**Title:** *Diabetes Care and Control in the Austin Community*  
**Principal Investigator:** Carnethon M  
**Project period:** 08/01/2011 – 07/30/2012

**Agency:** Diabetes Action Research and Education Foundation  
**Title:** *Coaching for Control: A Pilot Study of a Medical Student Intervention to Promote Diabetes Self Care in High Risk Settings*  
**Principal Investigator:** Carnethon M  
**Percent effort:** 1%  
**Project period:** 01/01/2013 – 12/31/2013

**Agency:** NIH/ NHLBI  
**ID#:** K01 HL73249-01  
**Title:** *Autonomic Function in Insulin Resistance and Diabetes*  
**Principal Investigator:** Carnethon M  
**Percent effort:** 75%  
**Project period:** 06/01/2003 – 05/31/2006

#### INVITED LECTURES

##### A. International/National

1. "Evidence for Identifying the Temporal Association between Depression and Diabetes". University of Alabama, Birmingham Obesity Research Seminar Series. April 2006.
2. "Epidemic of Obesity and Diabetes in Children and Adolescents" New York State Diabetes Association. Saratoga Springs, NY. June 2006.
3. "Cardiorespiratory fitness in women". American Heart Association Scientific Sessions. Orlando Florida November 2007.
4. "Physical Activity and CVD—How Much is Enough?" Building Healthy Lifestyles Conference, Arizona State University, Mesa, AZ, February 2008.
5. Depression and Diabetes". to the Community Health Plan of Seattle Behavioral Medicine and Health Conference (Seattle, WA) May 2008
6. Association of Physical Activity and Fitness on the Development of Cardiovascular Disease Risk Factors in Women: CARDIA". Symposium, American College of Sports Medicine Annual Meeting (Seattle, WA) May 2009.

7. "Free sources of physical activity data for epidemiologic research" American College of Sports Medicine, Tutorial (Baltimore, MD). June 2010.
8. Epidemiology of type 2 diabetes in normal weight adults." Department of Epidemiology, University of North Carolina at Chapel Hill (Chapel Hill, NC); Department of Health Studies (Winston-Salem NC); Stanford Prevention Research Center (Palo Alto, CA). March 2011.
9. "Risk factors associated with development of normal weight diabetes" America Heart Association Council on Epidemiology and Prevention (Atlanta, GA) March 2011.
10. "Cost effectiveness of workplace wellness programs". European Society for the Prevention of Cardiovascular Disease. (Geneva, Switzerland) April 2011.
11. "Dose-response of physical activity in relation to metabolic disorders" Palo Alto Medical Foundation, Mountain View, CA, October 2011
12. "Building an Innovative Research Career". Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC December 2011.
13. "Sleep and Cardiovascular Disease: An Understudied Risk Factor". University of Alabama at Birmingham, Department of Epidemiology, March 2012.
14. "Epidemiologic Study of Racial and Ethnic Differences in Sleep". Perelman School of Medicine, University of Pennsylvania Center for Sleep and Circadian Neurobiology. June 2013
15. "Work/life balance". AAMC Minority Faculty Development Conference. New Orleans, LA October 2013.
16. "Current State of Workplace Wellness Programs: Are they Ready for Prime Time?" American Heart Association Scientific Sessions, Dallas, TX November 2013
17. "Contribution of Low Fitness to Race/Ethnic Differences in Diabetes Onset and Complications" American Heart Association Scientific Sessions, Dallas, TX November 2013
18. "Physical Activity in Type 2 Diabetes" American Heart Association Scientific Sessions, Dallas, TX November 2013
19. "Metabolically Obese Normal Weight and Metabolically Healthy Obese: Are these truly unique phenotypes?" Department of Nutrition. Cardiovascular Disease Epidemiology Seminar Series. Harvard School of Public Health. December 2013.
20. "Clinical consequences of metabolically obese normal weight" The Obesity Society Annual Meeting. Boston, MA. October 2014
21. "Prevention of obesity and cardiovascular diseases" The American Heart Association Scientific Sessions. Orlando, FL 2015.
22. "Contribution of Lifestyle Behaviors to the Obesity Paradox in Diverse Populations" Department of Kinesiology, Pennsylvania State University, State College, PA. March 2, 2016
23. "Racial disparities in chronotype and the contribution to cardiovascular disease". Associated Professional Sleep Society, Denver CO, June 2016
24. "Race/Ethnic Differences in Sleep Related Cardiovascular Disease" Program to Increase Diversity in Behavioral Medicine and Sleep Disorders Research (PRIDE) NYU Langone Medical Center. New York, August 1, 2017
25. "Rapid Fire Science". American Heart Association Emerging Research Leaders Conference Faculty. Denver, CO September 18, 2017
26. "Obesity and Diabetes: A Public Health Crisis in Hispanic/Latinos". Oral Symposium. The Obesity Society, Washington DC, October 31, 2017
27. "Racial/Ethnic Disparities in Cardiovascular Disease" Invited Panelist Annual Conference at University of Alabama Birmingham NIMHD funded U54 Center for Healthy African American Men through Partnerships (CHAAMPS). October 30, 2017
28. "Healthy Aspirations: The Disconnect between Americans Desire for a Healthy Lifestyle and Actual Lifestyle in the United States". American Heart Association Scientific Sessions. Anaheim, CA. November 12, 2017
29. "Cardiovascular Health in African Americans" Medical University of South Carolina School of Nursing, Charleston, SC. May 2018.
30. "Career Development Award Mechanisms to Promote Diversity at the NHLBI", NIH/NHLBI Bethesda, MD May 2018
31. "Cardiovascular Disease Disparities in the United States", NIH/NHLBI and EPA meeting Bethesda, MD May 2019

32. "Neighborhood Influences on Obesity" Martin Luther King, Jr Disparities Seminar at the University of Vermont School of Medicine, January 2020
33. "Reproductive History as a Cardiovascular Disease Risk Factor for Women". University Hospitals, Case Western Reserve University Cardiology Grand Rounds, February 2020
34. "The COVID-19 Pandemic and Seniors: A Look at Racial Health Disparities". US Senate Special Committee on Aging Testimony on July 21, 2020
35. "Obesity and Women's Health". National Heart, Lung and Blood Institute Conference on Women's Health. September 2020
36. "Role of Underlying Chronic Conditions on Long-Term COVID-19 Outcomes". National Disability Forum Conference for the Social Security Administration, November 18, 2020
37. "COVID-19 and Vaccines". RURAL Health Study Go Red for Women Workshop. February 27, 2021 Jackson, MS
38. "Vaccine Equity Panel" Society for Epidemiologic Research, Experts Panel. March 9, 2021.
39. "The 24-Hour Activity Cycle: How the Balance and Timing of Physical Activity, Sleep and Diet Contribute to Metabolic Health". The William Hansel Visiting Lectureship at the Pennington Biomedical Research Center, Baton Rouge, LA. March 11, 2021.
40. "Disparities in COVID-19 and the Role of Cardiovascular Diseases". American Heart Association, Council on Epidemiology and Prevention Keynote address. March 2021

**B. Regional (Midwest USA and Chicago, IL)**

1. "Worksite Wellness Programs for Cardiovascular Disease Prevention." Medicine Grand Rounds, St. Joseph's Regional Hospital (South Bend, IN) March 17, 2010.
2. "Balancing professional and personal interests". AAMC Minority Faculty Development Conference. Chicago, IL October 2012.
3. "Women and cardiovascular disease". Women's Health Course at the University of Chicago. January 2013
4. "Metabolically Healthy Obese and Metabolically Obese Normal Weight: Implications for Diabetes and Mortality". Symposium. American Diabetes Association Scientific Sessions. Chicago, IL June 2013
5. "Metabolically Healthy Obesity: Reality or Fantasy?" Advances in Cardiovascular Lifestyle Medicine. William Beaumont Health System, Detroit, MI. March 2014
6. "Contribution of Lifestyle Behaviors on the Obesity Paradox" University of Illinois at Chicago Department of Physical Therapy. Chicago, IL March 2015
7. "Obesity Paradox in Diabetes Outcomes". Division of Endocrinology Rounds, John H. Stroger Hospital. Feb 2018.
8. "COVID-19 in the Chicago, IL Area". St. James Catholic Church Social Care Board. February 11, 2021
9. "Understanding the Importance of COVID-19 Vaccines". Noble Charter School Network. February 17, 2021

**C. Local (Northwestern University)**

1. "Role of Lifestyle Factors on Metabolic Syndrome". Feinberg School of Medicine, Northwestern University Alumni Weekend. April 2006.
2. "Metabolic Syndrome and Heart Disease in Women". Women and Heart Disease Conference. Feinberg School of Medicine. (Chicago, IL). February 2010
3. "Social and cultural determinants of diabetes". Health Disparities week. Feinberg School of Medicine, Northwestern University October 2011
4. "Global Burden of Cardiovascular Disease Attributable to Diabetes and Hypertension" International meeting on hypertensive and diabetic heart disease. Division of Cardiology, Feinberg School of Medicine, Northwestern University, October 2011.
5. "Population Studies of Metabolically Obese Normal Weight", Endocrinology Grand Rounds/Northwestern Comprehensive Center for Obesity, Feinberg School of Medicine, Northwestern University October 2011.
6. "Disparities in Sleep Characteristics by Race/Ethnicity: A Population Based Study". Northwestern University Institute for Population Research Seminar Series.
7. "Careers in Epidemiology and Translational Science". Medical Student Research Conference, Feinberg School of Medicine, Northwestern University. June 2013.

8. "Racial Disparities in Diabetes Onset and Complications". Institute for Public Health and Medicine, Feinberg School of Medicine, March 2018.
9. "Mentoring Workshop: 2 Guiding Principles". Feinberg School of Medicine, March 2018
10. "Developing S.M.A.R.T. goals" General Internal Medicine, Spring 2019
11. "Negotiations: The Power of 'No'" Women in Medicine Conference, Feinberg School of Medicine Northwestern, October 2019.
12. "Career planning and Goal Setting" Department of Dermatology, November 2019
13. "Individual Career Advancement Plans and the Development of SMART goals" Department of Rheumatology, December 2019
14. "Career Advancement Planning" Department of Pathology, December 2019

## PUBLICATIONS AND SCHOLARLY WORK

### A. Peer-Reviewed Original Investigations

1. Din-Dzietham R, Liao D, Diez-Roux A, Nieto FJ, Paton C, Howard G, Brown A, **Carnethon M**, Tyroler HA. Association of educational achievement with pulsatile arterial diameter change of the common carotid artery: the Atherosclerosis Risk in Communities (ARIC) Study, 1987-1992. *Am J Epidemiol.* 2000;152(7):617-627
2. **Carnethon MR**, Liao D, Evans GW, Cascio WE, Chambliss LE, Heiss G. Correlates of the shift in heart rate variability with an active postural change in a healthy population sample: The Atherosclerosis Risk In Communities study. *Am Heart J.* 2002;143(5):808-813
3. **Carnethon MR**, Liao D, Evans GW, Cascio WE, Chambliss LE, Rosamond WD, Heiss G. Does the cardiac autonomic response to postural change predict incident coronary heart disease and mortality? The Atherosclerosis Risk in Communities Study. *Am J Epidemiol.* 2002;155(1):48-56
4. **Carnethon MR**, Palaniappan LP, Burchfiel CM, Brancati FL, Fortmann SP. Serum insulin, obesity, and the incidence of type 2 diabetes in black and white adults: the atherosclerosis risk in communities study: 1987-1998. *Diabetes Care.* 2002;25(8):1358-1364.PMC3132185
5. Liao D, **Carnethon M**, Evans GW, Cascio WE, Heiss G. Lower heart rate variability is associated with the development of coronary heart disease in individuals with diabetes: the atherosclerosis risk in communities (ARIC) study. *Diabetes.* 2002;51(12):3524-3531
6. Palaniappan LP, **Carnethon MR**, Fortmann SP. Heterogeneity in the relationship between ethnicity, BMI, and fasting insulin. *Diabetes Care.* 2002;25(8):1351-1357.PMC3121929
7. **Carnethon MR**, Anthony MS, Cascio WE, Folsom AR, Rautaharju PM, Liao D, Evans GW, Heiss G. A prospective evaluation of the risk of QT prolongation with hormone replacement therapy: the atherosclerosis risk in communities study. *Ann Epidemiol.* 2003;13(7):530-536
8. **Carnethon MR**, Anthony MS, Cascio WE, Folsom AR, Rautaharju PM, Liao D, Evans GW, Heiss G. Prospective association between hormone replacement therapy, heart rate, and heart rate variability. The Atherosclerosis risk in communities study. *J Clin Epidemiol.* 2003;56(6):565-571
9. **Carnethon MR**, Fortmann SP, Palaniappan L, Duncan BB, Schmidt MI, Chambliss LE. Risk factors for progression to incident hyperinsulinemia: the Atherosclerosis Risk in Communities Study, 1987-1998. *Am J Epidemiol.* 2003;158(11):1058-1067

10. **Carnethon MR**, Gidding SS, Nehgme R, Sidney S, Jacobs DR, Jr., Liu K. Cardiorespiratory fitness in young adulthood and the development of cardiovascular disease risk factors. *JAMA*. 2003;290(23):3092-3100
11. **Carnethon MR**, Golden SH, Folsom AR, Haskell W, Liao D. Prospective investigation of autonomic nervous system function and the development of type 2 diabetes: the Atherosclerosis Risk In Communities study, 1987-1998. *Circulation*. 2003;107(17):2190-2195
12. **Carnethon MR**, Jacobs DR, Jr., Sidney S, Liu K, study C. Influence of autonomic nervous system dysfunction on the development of type 2 diabetes: the CARDIA study. *Diabetes Care*. 2003;26(11):3035-3041
13. **Carnethon MR**, Kinder LS, Fair JM, Stafford RS, Fortmann SP. Symptoms of depression as a risk factor for incident diabetes: findings from the National Health and Nutrition Examination Epidemiologic Follow-up Study, 1971-1992. *Am J Epidemiol*. 2003;158(5):416-423
14. Palaniappan L, **Carnethon M**, Fortmann SP. Association between microalbuminuria and the metabolic syndrome: NHANES III. *Am J Hypertens*. 2003;16(11 Pt 1):952-958
15. Park YW, Zhu S, Palaniappan L, Heshka S, **Carnethon MR**, Heymsfield SB. The metabolic syndrome: prevalence and associated risk factor findings in the US population from the Third National Health and Nutrition Examination Survey, 1988-1994. *Arch Intern Med*. 2003;163(4):427-436.PMC3146257
16. Wrone EM, **Carnethon MR**, Palaniappan L, Fortmann SP, Third National H, Nutrition Examination S. Association of dietary protein intake and microalbuminuria in healthy adults: Third National Health and Nutrition Examination Survey. *Am J Kidney Dis*. 2003;41(3):580-587
17. **Carnethon MR**, Loria CM, Hill JO, Sidney S, Savage PJ, Liu K, Coronary Artery Risk Development in Young Adults s. Risk factors for the metabolic syndrome: the Coronary Artery Risk Development in Young Adults (CARDIA) study, 1985-2001. *Diabetes Care*. 2004;27(11):2707-2715
18. Eimer MJ, Ekery DL, Rigolin VH, Bonow RO, **Carnethon MR**, Cotts WG. Elevated B-type natriuretic peptide in asymptomatic men with chronic aortic regurgitation and preserved left ventricular systolic function. *Am J Cardiol*. 2004;94(5):676-678
19. Kinder LS, **Carnethon MR**, Palaniappan LP, King AC, Fortmann SP. Depression and the metabolic syndrome in young adults: findings from the Third National Health and Nutrition Examination Survey. *Psychosom Med*. 2004;66(3):316-322
20. Palaniappan L, **Carnethon MR**, Wang Y, Hanley AJ, Fortmann SP, Haffner SM, Wagenknecht L, Insulin Resistance Atherosclerosis S. Predictors of the incident metabolic syndrome in adults: the Insulin Resistance Atherosclerosis Study. *Diabetes Care*. 2004;27(3):788-793
21. **Carnethon MR**, Bertoni AG, Shea S, Greenland P, Ni H, Jacobs DR, Jr., Saad M, Liu K. Racial/Ethnic differences in subclinical atherosclerosis among adults with diabetes: the multiethnic study of atherosclerosis. *Diabetes Care*. 2005;28(11):2768-2770
22. **Carnethon MR**, Gulati M, Greenland P. Prevalence and cardiovascular disease correlates of low cardiorespiratory fitness in adolescents and adults. *JAMA*. 2005;294(23):2981-2988
23. **Carnethon MR**, Jacobs DR, Jr., Sidney S, Sternfeld B, Gidding SS, Shoushtari C, Liu K. A longitudinal study of physical activity and heart rate recovery: CARDIA, 1987-1993. *Med Sci Sports Exerc*. 2005;37(4):606-612

24. Daviglus ML, Greenland P, Stamler J, Elliott P, Appel LJ, **Carnethon MR**, Chan Q, Claeys G, Kesteloot H, Miura K, Nakagawa H, Pirzada A, Steffen L, Yan LL, Zhou B, Dyer AR. Relation of nutrient intake to microalbuminuria in nondiabetic middle-aged men and women: International Population Study on Macronutrients and Blood Pressure (INTERMAP). *Am J Kidney Dis.* 2005;45(2):256-266.PMC6556768
25. **Carnethon MR**, Lynch EB, Dyer AR, Lloyd-Jones DM, Wang R, Garside DB, Greenland P. Comparison of risk factors for cardiovascular mortality in black and white adults. *Arch Intern Med.* 2006;166(11):1196-1202
26. **Carnethon MR**, Prineas RJ, Temprosa M, Zhang ZM, Uwaifo G, Molitch ME, Diabetes Prevention Program Research G. The association among autonomic nervous system function, incident diabetes, and intervention arm in the Diabetes Prevention Program. *Diabetes Care.* 2006;29(4):914-919.PMC1751934
27. Kizilbash MA, **Carnethon MR**, Chan C, Jacobs DR, Sidney S, Liu K. The temporal relationship between heart rate recovery immediately after exercise and the metabolic syndrome: the CARDIA study. *Eur Heart J.* 2006;27(13):1592-1596
28. **Carnethon MR**, Biggs ML, Barzilay JI, Smith NL, Vaccarino V, Bertoni AG, Arnold A, Siscovick D. Longitudinal association between depressive symptoms and incident type 2 diabetes mellitus in older adults: the cardiovascular health study. *Arch Intern Med.* 2007;167(8):802-807
29. Gunderson EP, Lewis CE, Tsai AL, Chiang V, **Carnethon M**, Quesenberry CP, Jr., Sidney S. A 20-year prospective study of childbearing and incidence of diabetes in young women, controlling for glycemia before conception: the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Diabetes.* 2007;56(12):2990-2996.PMC2952440
30. Jae SY, **Carnethon MR**, Heffernan KS, Choi YH, Lee MK, Fernhall B. Association between cardiorespiratory fitness and prevalence of carotid atherosclerosis among men with hypertension. *Am Heart J.* 2007;153(6):1001-1005
31. Kizilbash MA, **Carnethon MR**, Chan C, Jacobs DR, Jr., Lloyd-Jones DM, Sidney S, Liu K. The association of heart rate recovery immediately after exercise with coronary artery calcium: the coronary artery risk development in young adults study. *Clin Auton Res.* 2007;17(1):46-49.PMC1797060
32. Ueshima H, Stamler J, Elliott P, Chan Q, Brown IJ, **Carnethon MR**, Daviglus ML, He K, Moag-Stahlberg A, Rodriguez BL, Steffen LM, Van Horn L, Yarnell J, Zhou B, Group IR. Food omega-3 fatty acid intake of individuals (total, linolenic acid, long-chain) and their blood pressure: INTERMAP study. *Hypertension.* 2007;50(2):313-319.PMC6556770
33. Berry JD, Dyer A, **Carnethon M**, Tian L, Greenland P, Lloyd-Jones DM. Association of traditional risk factors with cardiovascular death across 0 to 10, 10 to 20, and >20 years follow-up in men and women. *Am J Cardiol.* 2008;101(1):89-94
34. Burke GL, Bertoni AG, Shea S, Tracy R, Watson KE, Blumenthal RS, Chung H, **Carnethon MR**. The impact of obesity on cardiovascular disease risk factors and subclinical vascular disease: the Multi-Ethnic Study of Atherosclerosis. *Arch Intern Med.* 2008;168(9):928-935.PMC2931579
35. **Carnethon MR**, Craft LL. Autonomic regulation of the association between exercise and diabetes. *Exerc Sport Sci Rev.* 2008;36(1):12-18

36. **Carnethon MR**, Yan L, Greenland P, Garside DB, Dyer AR, Metzger B, Daviglus ML. Resting heart rate in middle age and diabetes development in older age. *Diabetes Care*. 2008;31(2):335-339

37. Golden SH, Lazo M, **Carnethon M**, Bertoni AG, Schreiner PJ, Diez Roux AV, Lee HB, Lyketsos C. Examining a bidirectional association between depressive symptoms and diabetes. *JAMA*. 2008;299(23):2751-2759.PMC2648841

38. Jae SY, **Carnethon MR**, Ahn ES, Heffernan KS, Choi YH, Lee MK, Fernhall B. Association between heart rate recovery after exercise testing and plasminogen activator inhibitor 1, tissue plasminogen activator, and fibrinogen in apparently healthy men. *Atherosclerosis*. 2008;197(1):415-419

39. Jae SY, **Carnethon MR**, Heffernan KS, Choi YH, Lee MK, Park WH, Fernhall B. Slow heart rate recovery after exercise is associated with carotid atherosclerosis. *Atherosclerosis*. 2008;196(1):256-261

40. Ohira T, Diez Roux AV, Prineas RJ, Kizilbash MA, **Carnethon MR**, Folsom AR. Associations of psychosocial factors with heart rate and its short-term variability: multi-ethnic study of atherosclerosis. *Psychosom Med*. 2008;70(2):141-146

41. Sundaram S, **Carnethon M**, Polito K, Kadish AH, Goldberger JJ. Autonomic effects on QT-RR interval dynamics after exercise. *Am J Physiol Heart Circ Physiol*. 2008;294(1):H490-497

42. Wang H, Necheles J, **Carnethon M**, Wang B, Li Z, Wang L, Liu X, Yang J, Tang G, Xing H, Xu X, Wang X. Adiposity measures and blood pressure in Chinese children and adolescents. *Arch Dis Child*. 2008;93(9):738-744

43. Auchincloss AH, Diez Roux AV, Mujahid MS, Shen M, Bertoni AG, **Carnethon MR**. Neighborhood resources for physical activity and healthy foods and incidence of type 2 diabetes mellitus: the Multi-Ethnic study of Atherosclerosis. *Arch Intern Med*. 2009;169(18):1698-1704.PMC2828356

44. **Carnethon MR**, Sternfeld B, Schreiner PJ, Jacobs DR, Jr., Lewis CE, Liu K, Sidney S. Association of 20-year changes in cardiorespiratory fitness with incident type 2 diabetes: the coronary artery risk development in young adults (CARDIA) fitness study. *Diabetes Care*. 2009;32(7):1284-1288.PMC2699748

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## B. Commentaries, Editorials and Reviews

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6. **Carnethon MR**. Diabetes mellitus in the absence of obesity: a risky condition. *Circulation*. 2014;130(24):2131-2132
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#### C. Books and Book Chapters

1. **Carnethon MR**. "Life Expectancy in Black Males." In *State of Black America: Portrait of the Black Male*. National Urban League Editor Jones SJ. Beckham Publications Group, 2007.
2. **Carnethon MR**. "Physical activity and metabolic syndrome in obesity". In *Advances in Physical Activity and Obesity*. Editors: Katzmarzyk P and Bouchard C. Human Kinetics, 2010.

3. Albert MA and **Carnethon MR**. "Cardiovascular Disease in Heterogeneous Populations". In Braunwald's Heart Disease. 11<sup>th</sup> Edition. Editors: Zipes, Libby, Bonow, Mann and Tomaselli. 2019.

**D. Practice Guidelines, Standards, and Consensus Statements**

1. American Heart Association Nutrition C, Lichtenstein AH, Appel LJ, Brands M, **Carnethon M**, Daniels S, Franch HA, Franklin B, Kris-Etherton P, Harris WS, Howard B, Karanja N, Lefevre M, Rudel L, Sacks F, Van Horn L, Winston M, Wylie-Rosett J. Diet and lifestyle recommendations revision 2006: a scientific statement from the American Heart Association Nutrition Committee. *Circulation*. 2006;114(1):82-96
2. Lichtenstein AH, Appel LJ, Brands M, **Carnethon M**, Daniels S, Franch HA, Franklin B, Kris-Etherton P, Harris WS, Howard B, Karanja N, Lefevre M, Rudel L, Sacks F, Van Horn L, Winston M, Wylie-Rosett J. Summary of American Heart Association Diet and Lifestyle Recommendations revision 2006. *Arterioscler Thromb Vasc Biol*. 2006;26(10):2186-2191
3. **Carnethon M**, Whitsel LP, Franklin BA, Kris-Etherton P, Milani R, Pratt CA, Wagner GR, American Heart Association Advocacy Coordinating C, Council on E, Prevention, Council on the Kidney in Cardiovascular D, Council on Nutrition PA, Metabolism. Worksite wellness programs for cardiovascular disease prevention: a policy statement from the American Heart Association. *Circulation*. 2009;120(17):1725-1741
4. Lloyd-Jones D, Adams R, **Carnethon M**, De Simone G, Ferguson TB, Flegal K, Ford E, Furie K, Go A, Greenlund K, Haase N, Hailpern S, Ho M, Howard V, Kissela B, Kittner S, Lackland D, Lisabeth L, Marelli A, McDermott M, Meigs J, Mozaffarian D, Nichol G, O'Donnell C, Roger V, Rosamond W, Sacco R, Sorlie P, Stafford R, Steinberger J, Thom T, Wasserthiel-Smoller S, Wong N, Wylie-Rosett J, Hong Y, American Heart Association Statistics C, Stroke Statistics S. Heart disease and stroke statistics--2009 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*. 2009;119(3):480-486
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7. Lloyd-Jones D, Adams RJ, Brown TM, **Carnethon M**, Dai S, De Simone G, Ferguson TB, Ford E, Furie K, Gillespie C, Go A, Greenlund K, Haase N, Hailpern S, Ho PM, Howard V, Kissela B, Kittner S, Lackland D, Lisabeth L, Marelli A, McDermott MM, Meigs J, Mozaffarian D, Mussolino M, Nichol G, Roger VL, Rosamond W, Sacco R, Sorlie P, Stafford R, Thom T, Wasserthiel-Smoller S, Wong ND, Wylie-Rosett J, American Heart Association Statistics C, Stroke Statistics S. Executive summary: heart disease and stroke statistics--2010 update: a report from the American Heart Association. *Circulation*. 2010;121(7):948-954
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#### MEDIA COVERAGE AND APPEARANCES

2003 "Fitness in Young Adulthood Predicts Heart Health in Middle Age" Multiple media coverage in Science Daily, NBC News, Huffington Post, Boston Globe, CNN, MedScape and others

2005 "Millions of Adults, Teens, Fail Fitness Test" Multiple media coverage in Washington Post, Fox News, Science Daily, California Health, Desert News and others

2007 "Depression Raises risk of Diabetes" Coverage in New York Times, Chicago Tribune, New Scientist, Reuters, MedicalXPress

2009 "Workplace wellness decreases healthcare costs" Coverage in EmaxHealth, National Public Radio

2010 "Low fitness in youth linked to hypertension". Coverage in WebMD, Medscape, US News

2011 "Sex as a heart attack trigger for couch potatoes" Huffington Post

2012 "Diabetes and the Obesity Paradox", "When Thinner Means Sicker" Coverage in the New York Times, Reuters, CNN, Web MD

2012 "When it comes to sleep, race may matter" Time. "How well you sleep may hinge on race" New York Times. "Sleep Influenced by Race, Ethnicity and Country of Origin" Huffington Post. "Sleep Study: Northwestern Study Finds Length of Sleep Varies by Race" Chicago Tribune.

2014 "Sleepless in America" Appearance on National Geographic Channel

2017 "NFL Play 60 Challenge Virtual Field Trip" Scientific Expert Volunteer on behalf of the American Heart Association

2017 "Baseball Players are Getting Fat Like Us" Op-Ed in USA Today

2018 "The Science of Longevity" November 14 Podcast by Slate Studios <https://itunes.apple.com/us/podcast/the-science-of-longevity/id1333735108?i=1000423370875&mt=2>

2018 "Young People Need to Turn Out for their Health" November 23, The Health Care Blog. <http://thehealthcareblog.com/blog/2018/11/23/young-people-need-to-turn-out-for-their-health/>

2018 "Where you live can promote or harm your health". OpEd in Thrive Global <https://thriveglobal.com/stories/where-you-live-can-promote-or-harm-our-health/>

2018 "This Holiday Season, Get Active". December 19 OpEd in the Morning Consult. <https://morningconsult.com/opinions/this-holiday-season-get-active/>

2019 "Protecting Immigrant Health is Good for the US" OpEd January 29 in The Hill. <https://thehill.com/opinion/immigration/427459-protecting-immigrant-health-is-good-for-the-us>

2019 "When it's cold outside, get moving indoors" OpEd by Emily Lattie and Mercedes Carnethon Thrive Global <https://thriveglobal.com/stories/when-its-cold-outside-get-moving-indoors/>

2019 "Are dietary supplements for real or just placebos?" OpEd in The Hill <https://thehill.com/opinion/healthcare/429800-are-dietary-supplements-for-real-or-just-placebos>

2019 "Protect Your Heart: Connecting the Dots between Maternal Health and Heart Health" OpEd by Mercedes Carnethon and Sadiya Khan Ms. Magazine. <https://msmagazine.com/2019/02/14/protect-heart-connecting-dots-maternal-health-heart-health/>

2019 "Are American Universities Training the Best People or the Wealthiest Ones" OpEd in TRT World <https://www.trtworld.com/opinion/are-american-universities-training-the-best-people-or-the-wealthiest-ones-24977>

2019 "Homophobia is Makes a Public Health Issue Worse". OpEd in US News & World Report. <https://www.usnews.com/news/healthiest-communities/articles/2019-03-25/commentary-homophobia-increases-life-expectancy-disparities-between-blacks-whites>

2019 "The link between sugary drinks, cancer and poor neighborhoods". OpEd in The Hill <https://thehill.com/opinion/healthcare/453017-the-link-between-sugary-drinks-cancer-and-poor-neighborhoods>

2019 "The Biggest Health Problem: Obesity". Scientific Blog in Scientific American. <https://blogs.scientificamerican.com/observations/the-biggest-health-problem-obesity/>

2019 "Commentary: The Biggest Women's World Cup Lesson: Teach Girls to be Competitive". <https://www.chicagotribune.com/opinion/commentary/ct-opinion-womens-world-cup-soccer-competition-20190703-qszfhrijiae7lcprj4tfeoey4y-story.html>

2019 "Are researchers to Blame for Nutrition Misinformation?" OpEd in The Hill . <https://thehill.com/opinion/healthcare/440222-are-researchers-to-blame-for-nutrition-misinformation>

2019 "Wearable technology: Do we really need 10,000 steps a day to be healthy?". OpEd in the Hill. <https://thehill.com/opinion/healthcare/447086-wearable-technology-do-we-really-need-10000-steps-a-day-to-be-healthy>

2020 "Many Wealthy Parents Won't Send Kids Back to School This Fall". Mother Jones Magazine April 28, 2020 <https://www.motherjones.com/politics/2020/04/many-wealthy-parents-wont-send-kids-back-to-school-this-fall-thats-a-disaster-waiting-to-happen/>

2020 "MAP: Where are COVID-19 Deaths Happening in Chicago, Most are in Majority-Black Neighborhoods." CBS 2 Chicago <https://chicago.cbslocal.com/map-where-are-covid-19-deaths-happening-the-most-in-chicago-neighborhoods-with-majority-black-populations/>

2020 "How lack of healthy food plays a role in COVID-19 Deaths in Chicago's Black Communities". CBS2 Chicago. <https://chicago.cbslocal.com/healthy-food-covid-deaths/> May 12, 2020

2020 "Study: COVID-19 spreads easier person-to-person" <https://www.fox32chicago.com/video/686584>. Fox 32 Chicago, May 21, 2020

2020 "How to Stay Safe while States Reopen" National Public Radio, Here & Now with Tonya Mosely June 12, 2020. <https://www.wbur.org/hereandnow/2020/06/12/coronavirus-reopening-guide>

2020 Opinion contributor on the epidemiology of COVID-19, MSNBC "The 11<sup>th</sup> Hour with Brian Williams", June 22, July 1, July 8, July 23, August 10

2020-21 Regular contributor on NBC Universal news programs (MNBC, NBC Now) on COVID-19: Incidence, epidemiology and vaccination.

## TEACHING

### *Department Courses*

<u>Dates</u>	<u>Role</u>	<u>Department (University)</u>	<u>Course Title</u>	<u>Audience</u>
1994-95	Teaching assistant	Psychology (Stanford University)	Issues in Sexual Health and Contraception	Undergraduate
2000	Teaching assistant	Epidemiology (UNC-Chapel Hill)	Epidemiologic Research Methods	Graduate
2006	Course Director	Preventive Medicine (Northwestern University)	Applied Epidemiologic Analysis	Graduate
2006-2009	Course Director	Preventive Medicine (Northwestern University)	Introduction to Epidemiology	Undergraduate and Graduate
2011-2012, 2014	Co-Course Director	Preventive Medicine (Northwestern University)	Practical Issue in Population Studies	Graduate
2014-2015	Course Director	Preventive Medicine (Northwestern University)	Obesity Epidemiology	Graduate/Medical Students

### *Conferences/ Workshops*

<u>Date</u>	<u>Conference (Location)</u>	<u>Responsibility</u>	<u>Audience</u>
Oct 2005	Lifelong Learners Course (Northwestern University)	Lecture: "Cardiovascular Complications of Diabetes and Metabolic Syndrome"	Community Education
July 2008 - Present	39 <sup>th</sup> Annual 10-Day Seminar on Cardiovascular Disease Epidemiology and Prevention (Lake Tahoe, CA)	Lecture: "Diabetes and Cardiovascular Disease" "Obesity Paradox Debate"	Postgraduate
2016, 2019	Programs to Increase Diversity in Epidemiology (PRIDE), Sleep and Cardiovascular Disease (New York University, Langonne Medical Center)	"Disparities in Sleep and Cardiovascular Disease"	Postgraduate

## TRAINEES

Term (Years)	Name (Position)	Project Title	Current Position
2004 – 2006	Mohammad A. Kizilbash, MD, MSCI (NRSA/NIH Post-doctoral fellow)	Non-invasive assessment of autonomic nervous system function	Private Practice
2004 – 2006	Arlene Hankinson, MD, MS (NRSA/NIH Post-doctoral fellow)	Fitness and cardiovascular health	Pharmaceutical Company
2004 – 2008	Sae Young Jae, PhD (Postdoctoral Fellow University of Illinois)	Cardiorespiratory fitness and heart rate recovery influences on cardiovascular and metabolic disease	Associate Professor, University of Seoul, South Korea
2006 – 2007	Nicole Mohlman, MD (MPH Degree Student)	Healthcare access in underserved communities	Private Practice
2006 – 2007	David Kattan, MD (MPH Degree Student)	Illinois perinatal HIV care, areas for Improvement	Private Practice
2010 - 2011	Claire O'Connell (MD MPH Degree Student)	Perceptions of neighborhood safety and physical activity in adolescents	Unknown
2009 – 2011	Christina Shay, Ph.D. (NRSA/NIH Postdoctoral Fellow)	Body composition, fitness, glucose dysregulation	Staff Scientist, American Heart Association
2010 – 2012	Laura Zimmerman, MD (Institute for Healthcare Studies Postdoctoral Fellow)	Factors associated with conversion from impaired fasting glucose to diabetes	Private Practice, Erie Family Health Center, Chicago, IL
2011 - 2013	Bonnie Bright (Undergraduate Summer Research Opportunity Program Student)	Environmental resources for diabetes control in underserved Chicago communities	Unknown
2011-2012, 2018-2020	Aderonke Bamgbose (Instructor, Psychiatry, Northwestern University)	Availability of healthcare resources for diabetes care and control in Chicago neighborhoods	Assistant Professor, Department of Psychiatry and Behavioral Sciences, Massachusetts General Hospital, Harvard University
2011 –2012	Atul Jain, MD (Vascular Medicine Postdoctoral Fellow)	Association of sleep with symptoms of peripheral arterial disease	Clinical Assistant Professor, Department of Medicine, University of Chicago
2011-2012	Megan McCarville, MD, MPH (Instructor, Department of General Academic Pediatrics, Children's Memorial Hospital)	Contribution of the school environment to obesity in Latino youth	Clinical Assistant Professor of Pediatrics at the University of Illinois at Chicago
2011-2013	Lester M. Arguelles, Ph.D. (Research Assistant Professor, Department of Preventive Medicine, FSM Northwestern University)	Association of Vitamin D with metabolic disorders in Chinese Youth	Blue Cross Blue Shield of Illinois /Adjunct Faculty University of Illinois at Chicago
2012-2014	Veronica Womack, Ph.D. (NIH/NHLBI T32 Postdoctoral fellow)	Mindfulness and cardiovascular health in African Americans	Associate Director for Inclusive Learning Communities Program, Searle Center for

Term (Years)	Name (Position)	Project Title	Current Position
			Advancing Teaching and Learning, Northwestern University
2011-2013	Amisha Wallia, MD, MSCI (Instructor, Division of Endocrinology, Department of Medicine, FSM Northwestern University)	Hyperglycemia in special populations	Associate Professor, Department of Medicine, Division of Endocrinology
2011 – 2014	M. Alexandra Friedman (Medical Student)	Developing a health coach model for the management of diabetes in underserved communities	Clinical Lecturer, Obstetrics and Gynecology, University of Michigan Health
2013-2014	Hannah Louks, MSEB (Master's in Epidemiology and Biostatistics Student)	Trends in pediatric kidney disease over time	Abbott Laboratories, Statistical Analyst
2012-2013	Allison Carroll (doctoral student Clinical Health Psychology)	Interaction of cigarette smoking and depressive symptoms with subclinical atherosclerosis	Postdoctoral Trainee Feinberg School of Medicine
2014-2015	Samantha Montag, MSEB (Masters in Epidemiology and Biostatistics Student)	Contribution of Sleep Characteristics on Cardiovascular and Metabolic Risk Factors	Statistical analyst, Abvie Pharmaceuticals
2013-2015	Rosalba Hernandez, PhD (Assistant Professor, University of Illinois Urbana Champaign)	Positive Psychology for the Preservation of Ideal Cardiovascular Health	Assistant Professor School of Social Work, University of Illinois-Champaign Urbana
2012-2016	Erica Marsh, MD MSCI (Assistant Professor, Department of Obstetrics and Gynecology at Feinberg School of Medicine, Northwestern University)	Uterine Leomyoma and Obesity	Professor and Chief of Reproductive Endocrinology at University Michigan
2010-Present	Kiari Kershaw, Ph.D. (Assistant Professor, DPM, Northwestern University)	Social environmental influences on cardiovascular disease	Associate Professor, Department of Preventive Medicine, Northwestern University
2011-2016	Laura Rasmussen-Torvik, Ph.D. (Assistant Professor, DPM, Northwestern University)	GWAS studies of type 2 diabetes	Associate Professor, Department of Preventive Medicine, Northwestern University
2015-2017	Abbi Lane-Cordova, Ph.D. (AHA SFRN Prevention Fellow)	Vascular disorders in pregnancy	Assistant Professor, Department of Exercise Science, Arnold School of Public Health at the University of South Carolina
2016-2018	Michael Bancks, Ph.D.	Association between glucose disorders and cognitive function	Assistant Professor, Wake Forest University,

Term (Years)	Name (Position)	Project Title	Current Position
	(NIH/NHLBI T32 Postdoctoral Fellow)		Division of Epidemiology
2014-Present	Yacob Tedla, Ph.D. (NIH/NHLBI T32 Postdoctoral Fellow 2014-2016)	Blood pressure across the lifecourse	Research Assistant Professor, Department of General Internal Medicine, Feinberg School of Medicine, Northwestern University
2016-Present	Inger Burnett-Ziegler, PhD	Mindfulness Based Stress Reduction in Federally Qualified Health Centers	Associate Professor, Department of Psychiatry and Behavioral Sciences
2016-2018	Ehimare Akhabue, MD (Instructor, Division of Cardiology, Department of Medicine)	The role of the renin-angiotensin system on disparities in heart failure	Assistant Professor (Clinical) Robert Wood Johnson Medical Institute, New Jersey
2015-2017	Lindsay Pool, Ph.D. (Postdoctoral fellow, AHA Disparities Strategically Focused Research Network)	Influence of socioeconomic factors on disparities in chronic disease	Project Officer, National Institutes of Health, National Heart, Lung and Blood Institute, Division of Cardiovascular Disease
2017-Present	Sadiya Khan, MD	Obesity in Cardiovascular Disease	Assistant Professor, Departments of Preventive Medicine and Medicine (Cardiology)
2017-Present	Elizabeth Hibler, PhD	Risks of heart failure following chemotherapy in young and early adult cancer survivors	Assistant Professor, Department of Preventive Medicine, Northwestern University
2017-2019	Wenze Zhong, Ph.D. (Postdoctoral fellow, AHA Strategically Focused Research Network on Prevention)	Dietary intake and cardiovascular disease in the population	Assistant Professor, Cornell University Department of Nutrition
2017-2019	Amanda Paluch, Ph.D. (Postdoctoral fellow, AHA Disparities Strategically Focused Research Network)	Contribution of fitness to chronic disease incidence and management	Assistant Professor, University of Massachusetts at Amherst, Department of Kinesiology
2017-2020	Sanaz Sedaghat, PhD (Rubicon Netherlands Research Foundation Postdoctoral fellow 2017-2019)	Hemodynamics linking kidney function and brain function	Research Assistant Professor, Department of Preventive Medicine (Epidemiology)
2017-Present	Leah Neubauer, EdD	Curriculum Development in Public Health	Assistant Professor, Department of

Term (Years)	Name (Position)	Project Title	Current Position
			Preventive Medicine (Public Health Practice)
2017-Present	Nia Heard-Garris, MD	Association of Adverse Childhood Experiences with Cardiovascular Risk	Instructor, Division of General Pediatrics, Robert H. Lurie Hospital
2019-Present	Erin Paquette, MD, JD, PhD	Diversity and inclusion in clinical trials of critically ill patients in the Pediatric Intensive Care Unit	Assistant Professor, Department of Pediatrics (Division of Pulmonary and Critical Care), Robert H. Lurie Hospital
2020-Present	Marquita Lewis-Thames, PhD	Rural Health Disparities in Cancer Care	Research Assistant Professor, Department of Medical Social Sciences, Northwestern University
2019-Present	Lauren Beach, JD, MPH	Cardiovascular disease among Sexual and Gender Minority Populations	Research Assistant Professor, Department of Medical Social Sciences, Northwestern University
2018-Present	Diana Chirinos Medina, Ph.D.	Depressive symptoms over the lifecourse and cardiovascular diseases in the population	Assistant Professor, Department of Preventive Medicine, Northwestern University
2020-2022	Aryn Phillips, PhD (Postdoctoral fellow, NIH/NHLBI T-32)	Alcohol use and abuse and chronic disease	Assistant Professor, Department of Health Policy and Management, University of Maryland at College Park
2020-2022	Michael Hammond, MD, MS (Postdoctoral Fellow, Vascular Medicine Research Fellowship Sponsored by the AHA)	Epidemiology of Peripheral Arterial Disease	Postdoctoral Fellow, Department of Medicine, Division of Cardiology
2021-Present	Charles German, MD, MS	Contribution of cardiorespiratory fitness to heart failure	Assistant Professor, Department of Medicine, Division of Cardiology, University of Chicago
2021-Present	Carolyn Foster, MD, MPH	HOMeVent4Kids: Home-based Optimization of Mechanical Ventilation for Children	Assistant Professor Department of Pediatrics, Northwestern University
2021-Present	Robert Booker	Physical activity, body composition and metabolic disease	Postdoctoral Fellow, Cardiovascular Disease

Term (Years)	Name (Position)	Project Title	Current Position
			Epidemiology T32 Program

# Exhibit B

## Materials Considered

## Exhibit B

### List of Materials Considered

#### 24HF Discovery Materials

- 24HF\_Production\_0000001
- 24HF\_Production\_0000044-0001962
- 24HF\_Production\_0002175-0002589
- 24HF\_Production\_0003406
- 24HF\_Production\_0231676-0232122
- 24HF\_Production\_0002659-0002682
- 24HF\_Production\_0002763-0002786
- 24HF\_Production\_0003338-0003361
- 24HF\_Production\_0126860-0126944
- 24HF\_Production\_0149425-0149476
- 24HF\_Production\_0149477-0149543
- 24HF\_Production\_0149544-0149592
- 24HF\_Production\_0149593-0149654
- 24HF\_Production\_0149908-0149975
- 24HF\_Production\_0155643-0155694
- 24HF\_Production\_0155695-0155761
- 24HF\_Production\_0155762-0155810
- 24HF\_Production\_0155811-0155872
- 24HF\_Production\_0155932-0155999
- 24HF\_Production\_0156126-0156193

#### Insurers Discovery Materials

- ARGUS000365-383
- ARGUS000428-443
- ARGUS000446-455
- ARGUS000467-479
- ARGUS000482-494
- ARGUS000502-518
- ARGUS000521-535
- ARGUS000541-563

#### Case Materials

- Complaint for Declaratory Relief filed in 24HF's adversarial proceeding in the United States Bankruptcy Court for the District of Delaware styled as *24 Hour Fitness Worldwide Inc. v. Continental Casualty Company et al.*, Case No. 20-11568 (KBO), Adv. Pro. No. 20-51051 (KBO).
- Amy Christensen Deposition, June 24, 2022, including all exhibits
- Dan Larson Deposition, April 28, 2022 including all exhibits
- Jason Carter Deposition, July 21, 2022 including all exhibits

- Jeremy Gottlieb Deposition, June 17, 2022 including all exhibits
- Lourdes Reyes Deposition, September 29, 2022 including all exhibits
- Matt Piro Deposition, April 27, 2022 including all exhibits
- Mike Allen Deposition, September 27, 2022 including all exhibits
- Odell Bradley Deposition, May 27, 2022 including all exhibits
- Tony Ueber Deposition, July 27, 2022 including all exhibits
- 30(b)(6) Deposition of Allied World National Assurance Company through Glenn Serrano Deposition, September 15, 2022 including all exhibits
- 30(b)(6) Deposition of Beazley-Lloyd's Syndicates 2623/623 through Andrea Mattot, October 11, 2022 including all exhibits
- 30(b)(6) Deposition of Continental Casualty Company through Tracy Schohn, April 14, 2022 including all exhibits
- 30(b)(6) Deposition of Starr Surplus Lines Insurance Company through Dolores Ramirez Valera, October 4, 2022 including all exhibits
- 24HF's Response to Defendant Continental Casualty Company's First Set of Interrogatories
- 24HF's Response to Insurers' First Set of Interrogatories

### **Other Publicly Available Materials**

- Wilkins JT, Gray EL, Wallia A, Hirschhorn LR, Zembower TR, Ho J, Kalume N, Agbo O, Zhu A, Rasmussen-Torvik LJ, Khan SS, Carnethon M, Huffman M, Evans CT. Seroprevalence and Correlates of SARS-CoV-2 Antibodies in Health Care Workers in Chicago. *Open Forum Infect Dis.* Jan 2021;8(1).
- Wilkins JT, Hirschhorn LR, Gray EL, Wallia A, Carnethon M, Zembower TR, Ho J, DeYoung BJ, Zhu A, Torvik LJR, Taiwo B, Evans CT. Serologic Status and SARS CoV-2 Infection over 6-Months of Follow-Up in Healthcare Workers in Chicago: A Cohort Study. *Infect Control Hosp Epidemiol.* Aug 9 2021:1-29.
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